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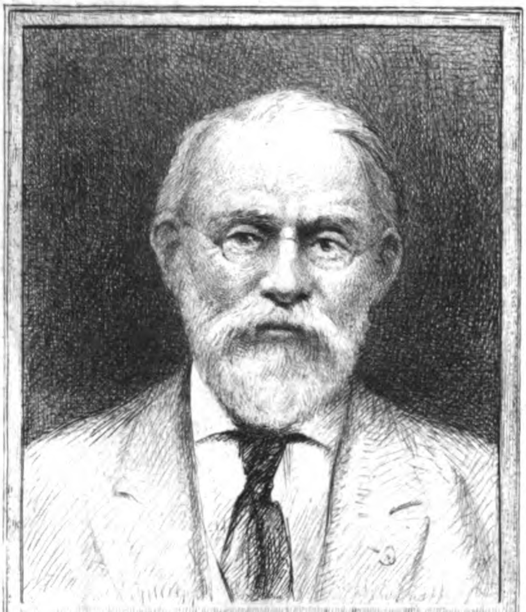
Journal of the United Service Institution of India

United Service Institution of India



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Vol. XIX.

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Viceroy and Governor-General of India, in the Chair.

ALEXANDER THE GREAT'S INVASION OF INDIA.

By the Hon'ble Lieut.-General **CHESNEY**, C. B., C. S. I., C. I. E., R. E.

IT is a trite remark that India has been many times invaded, and that with the single exception of our own case—if the term invasion can be properly applied to the process which has resulted in the creation of the British Indian Empire—the invader has always come from the North-Western Frontier. Some people think that India may again become the scene of one more invasion, or attempted invasion, and from the same quarter. This is a speculation, however, which it would not be appropriate to pursue on this occasion or in this company. The invasion to which I propose to invite your attention this afternoon is the invasion by Alexander the Great, the earliest recorded. Perhaps I should rather say the earliest but one, because among the many legends in honour of the god Bacchus, his peaceful conquest of India holds a conspicuous place ; and it was the spirit of emulation to surpass the exploits of the son of Jupiter which is said to have been a leading motive which impelled Alexander, who claimed to be descended himself from the hero of the Iliad, to undertake a similar conquest. The exploits of Bacchus, however, are legendary ; it is not till we come to the time of Alexander that we tread on the sure ground of history. Even here, however, we have not contemporary history. The most obviously trustworthy account of Alexander's campaigns in India is given by Arrian, a distinguished Greek historian and statesman who flourished in the time of the Roman Emperor Marcus Aurelius, that is, about the middle of the second century, A.D. Now, as Alexander the Great died nearly five hundred years before this, the account furnished by Arrian is first-hand only in the sense that a history, say by Mr. Froude, of the wars of The Roses, would be an authentic account of those events. It is generally understood, however, that Arrian reproduced the histories of contemporary historians which have since been lost; he possessed in an eminent degree the critical faculty, the gift of the countrymen of Thucydides and Aristotle, and he gives distances and numbers with such care and accuracy that it is possible to follow the route of Alexander's army from march to march, and to determine the site of his battle-fields with almost absolute certainty.

Many editions of Arrian have been published in recent years; the earliest English translation appeared at the end of the last century, by one John Rooke, which may still be read with interest and amusement, especially the preface, though perhaps not of the kind intended by the author. Rooke, or, as he calls himself, Mr. Rooke, dedicated his work to King George the Third, claiming in his preface that this was a peculiarly appropriate selection. For of Alexander he says: "nothing sacred or profane escaped the fury of his arms. Fire and sword were his constant attendants, * * * desolation and ruin followed his footsteps. * * * No rock nor mountains could stem the torrent of his rage; no rivers, seas, nor deserts check his dreadful course. On the other hand, "how widely different from this, nay, how directly opposite to this, is your Majesty's character!" Dedications are never written in this style now, when flattery in unknown.

Before proceeding to describe Alexander's invasion of India, I will endeavour to explain in as few words as possible the circumstances which brought him to the frontiers of that country. He was just twenty years of age when his father's death made him King of Macedon and commander of the Macedonian army, the most perfect military instrument ever produced until the time of the Roman legion. The Macedonians, it may be mentioned, although claiming to be of Greek descent, were really an uncivilized people with a thin veneer of Greek civilization. The Macedonian noble probably spoke Greek as a foreign language, much as a Highland gentleman two hundred years ago would speak English. It is recorded of King Philip as a remarkable circumstance that he spoke Greek with facility. Alexander, on the other hand, was brought up in Greece, the pupil of Aristotle; he was a Greek in culture and thought, although an irresponsible despot, with all the Greek ideas of democratic government and political equality. Greece had now entered on the period of decay; liberty and freedom had degenerated into faction; the power of combination against external foes was lost; and in its decline it fell an easy prey to the young and vigorous, if barbarous neighbours, whose power was embodied in a powerful and highly organized army, responsive to the will of one man. And Alexander, crushing without difficulty what remained of the liberties of ancient

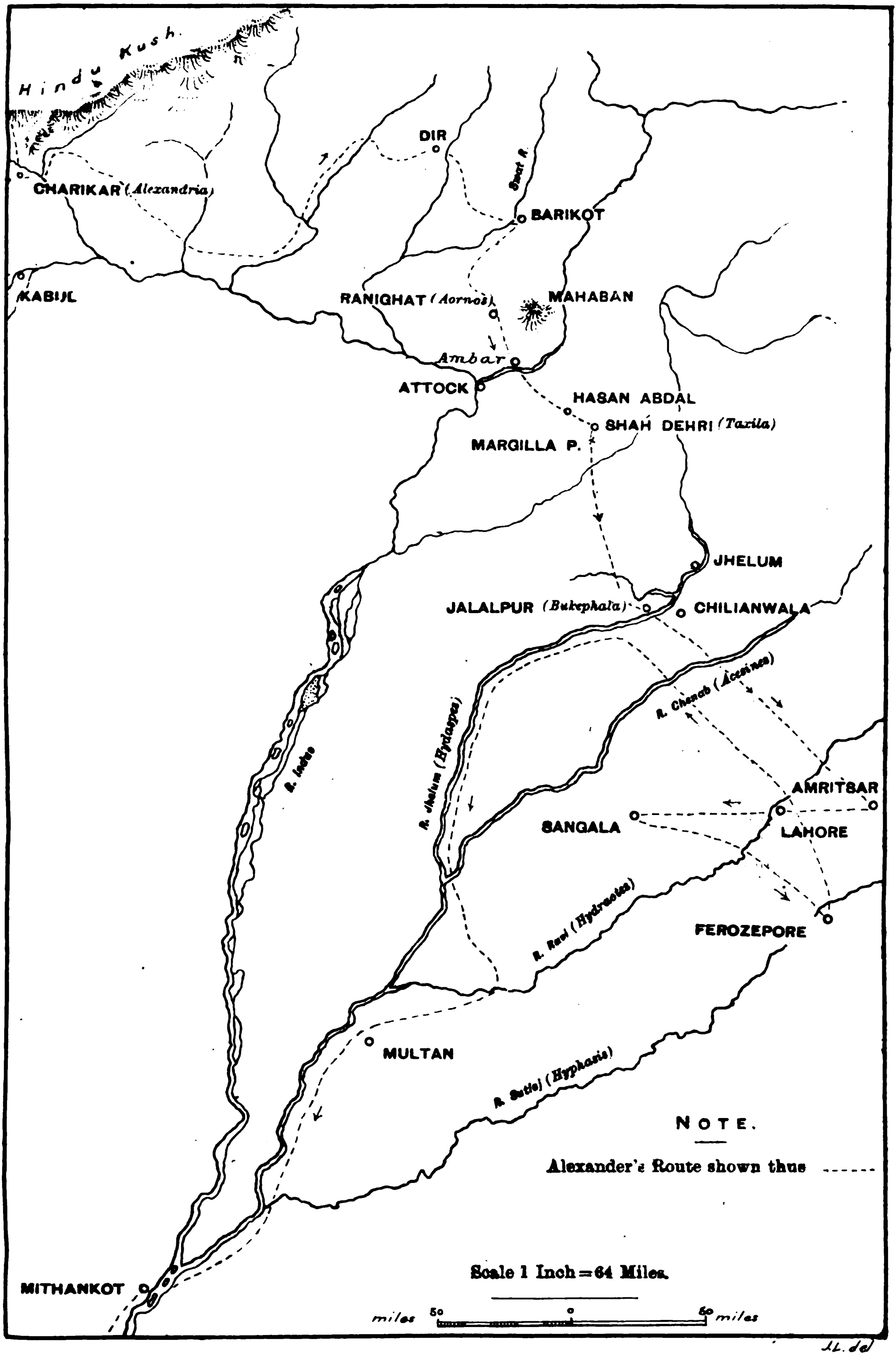
Greece, and practising terrible retribution in all cases where he encountered opposition, passed on in his twenty-second year to the conquest of Asia. One battle on the Granicus gave him Asia Minor, now a country with little more political significance than Tunis or Morocco, then made up of rich kingdoms and provinces teeming with people and studded with splendid cities; a second battle, that of Issus, opened the road to Syria and Egypt; a third, fought on the banks of the Tigris, finally disposed of the great Persian monarchy. These battles were remarkable for the small losses sustained by the Greeks, the great numbers of the enemy, and the enormous slaughter which took place of them. The fact is that numbers without discipline after a certain point are worse than useless; the men only get in each other's way. This was especially the case in the battles of old times fought at close quarters. To the troops which found themselves face to face with the Macedonian phalanx marching down on them, it was no help or satisfaction to know that there were half a million of men on their side, somewhere or other, scattered over several miles of ground. The merit was not in beating the Persians, notwithstanding the number of the latter, but in beating the Greek troops in the service of the Persian King, who had, moreover, besides Greek mercenary troops, a large number of Greek officials in his employ; in fact, the Persian army of that time was probably organized much in the same way as the Mahratta armies encountered by Lake and Wellington at the beginning of this century, that is, largely officered by foreigners. But the mere presence of Greeks on the Persian side did not make up for the want of discipline and enthusiasm. These enormous forces must have been little better than an armed rabble; and, as I have said, numbers beyond a certain point are of no use. The biographers of Sir Charles Napier have made a great point of the circumstance that at the battle of Meani the British force of less than 3,000 men was opposed by 40,000 of the enemy, "who fought desperately for several hours. Now the whole British loss in killed and wounded was under 300; so that, assuming every wound to have been inflicted by a separate sword or bullet, it follows that out of the 40,000 desperate fighters 39,700 contributed nothing to the fighting.

The moral is applicable to our own times. It is held to be a bloody battle when with two armies, each of one hundred thousand men, twenty thousand on each side are killed and wounded. Well, when forty thousand men are lying on the field killed and wounded, dead and dying, torn and mutilated in every way, heaven knows it is slaughter enough; but still the fact remains that even if we suppose the artillery to have caused none of the casualties—an extreme supposition—it is plain that four-fifths of each army have contributed nothing to the fight beyond making a noise, and that of the millions of cartridges fired off only a perfectly trifling percentage have taken effect. The moral of this is obvious. We may hope that the efforts which His Excellency the Commander-in-Chief is making to improve the musketry of the army will be pursued until a standard of shooting is arrived at, at which so much missing becomes impossible. And if the shooting becomes such that out of the hundred cartridges a man may fire during a fight even one only takes effect, the result would be, supposing the two armies to be equal in strength, that the enemy will be annihilated.

These three great battles were not all fought in one campaign. A notable feature of Alexander's strategy is that he did not follow up his beaten adversary, but turned off leisurely to conquer the remote parts of his empire. Three years elapsed between the battle of Granicus, on the shores of the Hellespont, and the final overthrow of Darius at Arbela, and five years more were occupied in subduing the most distant provinces of the great Persian Empire. Alexander's conquest extended to the Jaxartes, where he built the furthest of his many Alexandrias. Having established another Alexandria to the north of Kabul, identified with the modern Charikar, he set out for the conquest of India eight years after the opening of the war. The composition of this army must no doubt have been greatly changed since it set out from Macedonia. To say nothing of the losses by war and disease, garrisons had been left in the conquered cities. But no doubt these casualties were made good by fresh recruits from Greece and Macedonia, attracted by the prospect of plunder and promotion; and Alexander had also recruited largely from the warlike races of the countries brought under his dominion. But the same system and discipline pervaded all ranks. An army which had been in the field for eight years, and had marched from the heats of the Nile to the snows of the Hindu Kush, always victorious, was a perfect military engine.

India had not then the same definite boundary as now. The realm of the border king, Taxiles, appears to have extended from the neighbourhood of Kabul to the river Jhelum; but indeed the limit of India has seldom been conterminous with the present north-west frontier. Indian rulers have at different times extended their kingdoms far into Central Asia, and the dominions of Asian kings have often included a large slice of India. The notion that the mountains which border British India are a national hard-and-fast line is a conventional one and of modern origin. King Taxiles, whose kingdom was astride of the Indus, half on each side, came to Alexander with offers of friendship, so that the actual invasion of India at the outset was a peaceful one. But so far as can be told, although a part of the army may have marched by the Khaibar to the Indus escorted by the friendly King Taxiles, the main advance must have been in a more northerly line (see Plan 1). This part of the campaign is dealt with somewhat vaguely by the historians and no wonder, when we consider how little is known about the country traversed even now. But it would certainly appear that Alexander did not even go so far south as to Kabul, but marched eastward from the northern city called after him, through the difficult country on the north of the Kabul river. Mention is made of his crossing one considerable river on the way, either the Chitral or Swat river, and of his marching up the valley of that river to chastise and subdue the warlike people which then, as now, occupied these fastnesses. For it was his system never to leave a threatening enemy on his flank, but to follow him up and crush him. He must have crossed both these rivers; but whether he went up the first-named, perhaps as far as Dir, or whether his march

Plan I.


Hindu Kush.
DIR
Swat R.
CHARIKAR (Alexandria)
BARIKOT
KABUL
RANIGHAT (Aornos)
MAHABAN
Ambar
ATTOCK
HASAN ABDAL
SHAH DEHRI (Taxila)
MARGILLA P.
JHELUM
JALALPUR (Bukephala)
CHILIANWALA
R. Chenab (Acesines)
R. Indus
R. Jhelum (Hydaspes)
AMRITSAR
SANGALA
LAHORE
R. Ravi (Hydraotes)
FEROZEPORE
MULTAN
R. Sutlej (Hyphasis)
NOTE.
Alexander's Route shown thus
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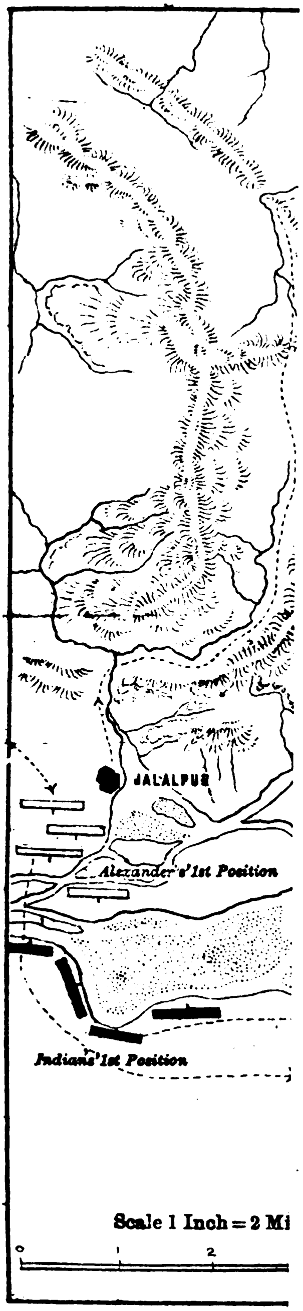
Scale 1 Inch = 64 Miles.
miles 50 0 50 miles

J.L. del

was up the Swat river, is uncertain. This much is known that, after a good deal of hard fighting, he came down to the Indus from the hills bordering the Yusafzai plain. This part of the campaign shows two things; first, the extraordinary energy of Alexander and the endurance of his troops; and secondly, that in an advance on India the Khaibar line is not the necessary route. We have been accustomed to consider the country north of the Kabul river as virtually impregnable. The march of Alexander's army is a practical proof to the contrary; and although he was not burdened with artillery, and had apparently only mule transport, yet the Greek soldiers all marched in heavy armour, which must have added greatly to the difficulties of warfare among those mountains. There is an obvious moral to be drawn by us from these incidents, although they happened more than two thousand years ago.

Alexander worked through these mountains on to the Yusafzai plain. One position has become especially celebrated there for the stubborn defence made—the rock Aornos, to which a large force of the "barbarians" had retreated, and where, the place being supplied with a stream of water, they prepared for a vigorous defence. A pathway up among the rocks having been discovered, the place was carried by storm, Alexander as usual leading the way and being the first man in, when such of the garrison as did not escape were put to the sword. The actual site of Aornos (a Greek word signifying a height so steep that no bird can alight on it) has been much discussed. By some it has been supposed to be the great mountain Mahaban, which forms so imposing an object from the railway near Attock; but I think we must admit that Sir Alexander Cunningham has satisfactorily identified it with the rocky position of Ranighat on the northern side of the Yusafzai plain, which exactly satisfies the description given by the Greek historian. All opposition from the mountaineers having been crushed, Alexander marched to the adjacent Indus, where his lieutenants had meanwhile constructed a bridge-of-boats which must have closely resembled the bridge-of-boats of the present day; the boats anchored in the stream by large stones, and connected by a superstructure strong enough to bear elephants, of which several had been presented to the Greeks by King Taxiles. The advance into India was made by way of the present trunk road and railway, through Taxila (the site of the present Shah Dehri, about ten miles east of Hasan Abdal), the capital of King Taxiles, the extent and wealth of which greatly impressed the Greeks, and offered inviting prospects of plunder further on. The route must, no doubt, have been continued through the Margilla pass past the present Rawal Pindi. So far the march had been through a friendly country, but behind the Jhelum (Hydaspes), Porus, the King of the Central Punjab, had taken up his position and was awaiting the invader. It is evidence of the remarkable wealth and, according to modern standards, the civilized condition of this part of India, that so comparatively small a country should have been able to maintain a well-appointed army of 50,000 foot, with 200 elephants, a large number of chariots, and a considerable cavalry. What is remarkable about this part of the advance is that it was not made direct on Jhelum, as would appear natural. True that line is over what would be a very difficult country, as any traveller by the existing road knows; still it would be the easiest line. Nevertheless it appears certain that Alexander took a more southerly line, and threading his way through the intricate ravines of the upper part of the salt range, and leaving Tilla and Rhotas on his left, penetrated that range by the gorge through which runs the Bhundhar river, and struck the river Jhelum at Jalalpur, about 30 miles below Jhelum (see Plan II). Here there was a long delay, for Porus was drawn up on the other side to dispute the passage. It was now the middle of the hot weather, when the Punjab rivers are in full flood from the melting snows of the Himalayas. Porus expected that Alexander would stop here till the cold season when the river is fordable, and he did stop; but it was while the boat-bridge was transported from the Indus—the larger boats in pieces, the smaller ones whole—and put up again on the Jhelum. The difficulty was even with a bridge to effect the passage in face of a determined and powerful enemy. The business was carried out by the operation so often successful in war, if well planned and executed—a flank march. The broken and picturesque hills which come down to the Jhelum at this point are pierced by a ravine which goes first to the north and then trending to the east comes down to the river about six miles above Jalalpur. Along this route, about 18 miles in all and just practicable for horses, covered from observation, Alexander led a small body of infantry and most of his cavalry. A bridge of boats was prepared here, screened from view by a large island, to which he led his troops over in the night. The Greeks, who had not been able to make any reconnaissances, the banks of the river being strongly patrolled by the Indians, appear to have thought this island, which is still in existence, or was till lately, was next the mainland, and were much disconcerted to find on crossing the stream that they had only got to another island with a broad stream beyond it. To add to the difficulty, a furious storm raged which, however, drowned the noise made by the troops. A ford was found, and the Greeks plunged into the water breast high, and got across; and by day-break had formed up in line at right angles to the river. Porus changed front to meet them: 4,000 cavalry, 300 chariots, 200 elephants, and 30,000 foot, the elephants in front, because the horses of the Greek cavalry would not face them. Alexander to avoid this divided his cavalry, in which force he was much superior both in numbers and discipline, into two bodies, and attacked on the two flanks. The Indian cavalry was driven back among the elephants: these beasts, galled by the arrows from the Greek archers in front, and thrown into confusion by the horsemen, became ungovernable, and, as if madness had seized them, "trampled under foot friends and foes without distinction, and at last making a hideous noise passed out of the battle." Alexander having surrounded the Indian cavalry with his own, "made a signal to the foot to close their shields together and advance in a firm body"—the Macedonian phalanx, in fact. The Indian cavalry thus attacked was almost entirely destroyed. At this point Alexander's second in-command, in



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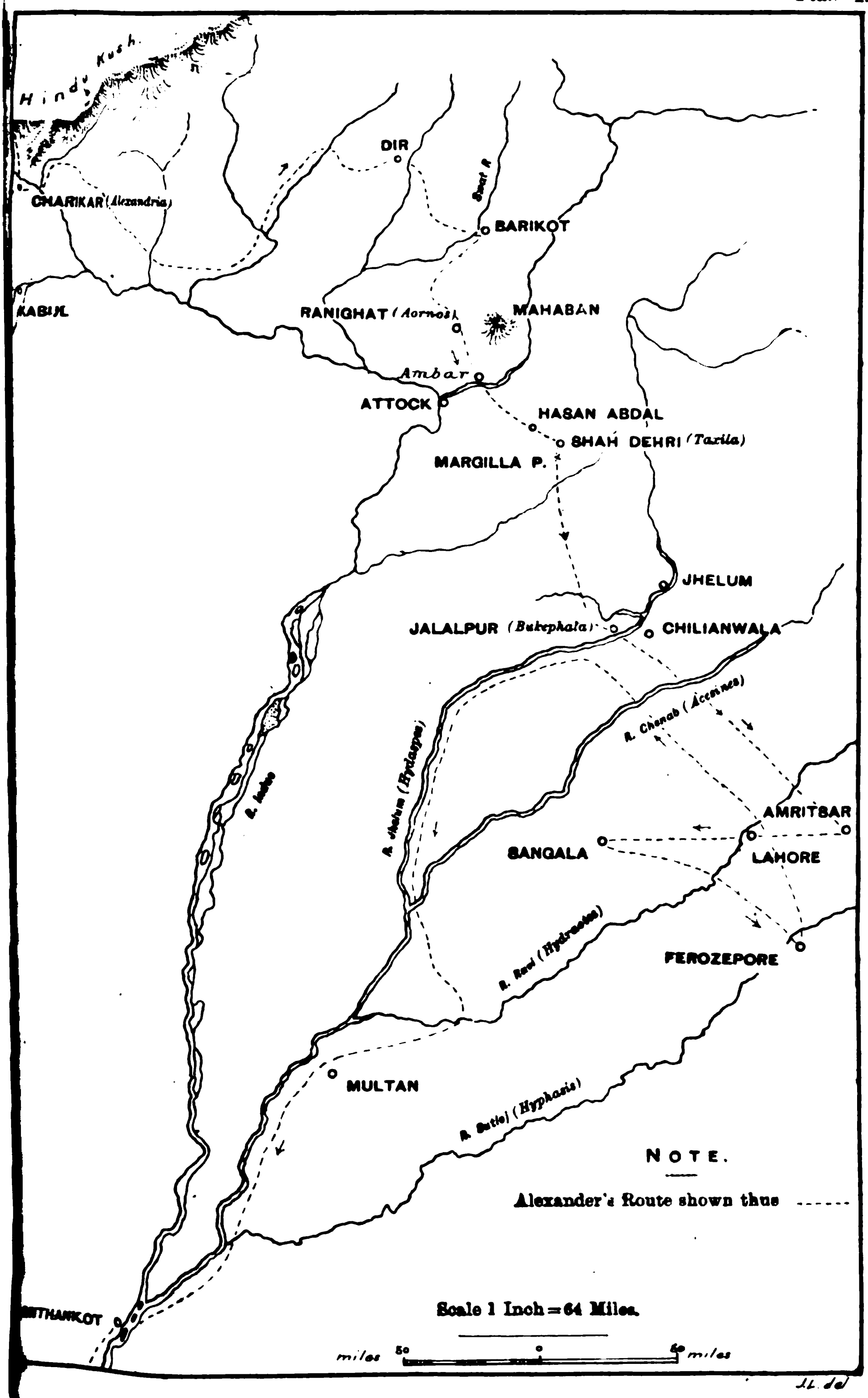
The moral is applicable to our own times. It is held to be a bloody battle when with two armies, each of one hundred thousand men, twenty thousand on each side are killed and wounded. Well, when forty thousand men are lying on the field killed and wounded, dead and dying, torn and mutilated in every way, heaven knows it is slaughter enough; but still the fact remains that even if we suppose the artillery to have caused none of the casualties—an extreme supposition—it is plain that four-fifths of each army have contributed nothing to the fight beyond making a noise, and that of the millions of cartridges fired off only a perfectly trifling percentage have taken effect. The moral of this is obvious. We may hope that the efforts which His Excellency the Commander-in-Chief is making to improve the musketry of the army will be pursued until a standard of shooting is arrived at, at which so much missing becomes impossible. And if the shooting becomes such that out of the hundred cartridges a man may fire during a fight even one only takes effect, the result would be, supposing the two armies to be equal in strength, that the enemy will be annihilated.

These three great battles were not all fought in one campaign. A notable feature of Alexander's strategy is that he did not follow up his beaten adversary, but turned off leisurely to conquer the remote parts of his empire. Three years elapsed between the battle of Granicus, on the shores of the Hellespont, and the final overthrow of Darius at Arbela, and five years more were occupied in subduing the most distant provinces of the great Persian Empire. Alexander's conquest extended to the Jaxartes, where he built the furthest of his many Alexandrias. Having established another Alexandria to the north of Kabul, identified with the modern Charikar, he set out for the conquest of India eight years after the opening of the war. The composition of this army must no doubt have been greatly changed since it set out from Macedonia. To say nothing of the losses by war and disease, garrisons had been left in the conquered cities. But no doubt these casualties were made good by fresh recruits from Greece and Macedonia, attracted by the prospect of plunder and promotion; and Alexander had also recruited largely from the warlike races of the countries brought under his dominion. But the same system and discipline pervaded all ranks. An army which had been in the field for eight years, and had marched from the heats of the Nile to the snows of the Hindu Kush, always victorious, was a perfect military engine.

India had not then the same definite boundary as now. The realm of the border king, Taxiles, appears to have extended from the neighbourhood of Kabul to the river Jhelum; but indeed the limit of India has seldom been conterminous with the present north-west frontier. Indian rulers have at different times extended their kingdoms far into Central Asia, and the dominions of Asian kings have often included a large slice of India. The notion that the mountains which border British India are a national hard-and-fast line is a conventional one and of modern origin. King Taxiles, whose kingdom was astride of the Indus, half on each side, came to Alexander with offers of friendship, so that the actual invasion of India at the outset was a peaceful one. But so far as can be told, although a part of the army may have marched by the Khaibar to the Indus escorted by the friendly King Taxiles, the main advance must have been in a more northerly line (see Plan I). This part of the campaign is dealt with somewhat vaguely by the historians and no wonder, when we consider how little is known about the country traversed even now. But it would certainly appear that Alexander did not even go so far south as to Kabul, but marched eastward from the northern city called after him, through the difficult country on the north of the Kabul river. Mention is made of his crossing one considerable river on the way, either the Chitral or Swat river, and of his marching up the valley of that river to chastise and subdue the warlike people which then, as now, occupied these fastnesses. For it was his system never to leave a threatening enemy on his flank, but to follow him up and crush him. He must have crossed both these rivers; but whether he went up the first-named, perhaps as far as Dir, or whether his march

Plan I.


Hindu Kush
DIR
Swat R.
CHARIKAR (Alexandria)
BARIKOT
KABUL
RANIGHAT (Aornos)
MAHABAN
Ambar
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HASAN ABDAL
SHAH DEHRI (Taxila)
MARGILLA P.
JHELUM
JALALPUR (Bukephala)
CHILIANWALA
R. Chenab (Acesines)
R. Indus
R. Jhelum (Hydaspes)
AMRITSAR
SANGALA
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R. Ravi (Hydraotes)
FEROZEPORE
MULTAN
R. Sutlej (Hyphasis)
NOTE.
Alexander's Route shown thus ------
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J.L. del

was up the Swat river, is uncertain. This much is known that, after a good deal of hard fighting, he came down to the Indus from the hills bordering the Yusafzai plain. This part of the campaign shows two things; first, the extraordinary energy of Alexander and the endurance of his troops; and secondly, that in an advance on India the Khaibar line is not the necessary route. We have been accustomed to consider the country north of the Kabul river as virtually impregnable. The march of Alexander's army is a practical proof to the contrary; and although he was not burdened with artillery, and had apparently only mule transport, yet the Greek soldiers all marched in heavy armour, which must have added greatly to the difficulties of warfare among those mountains. There is an obvious moral to be drawn by us from these incidents, although they happened more than two thousand years ago.

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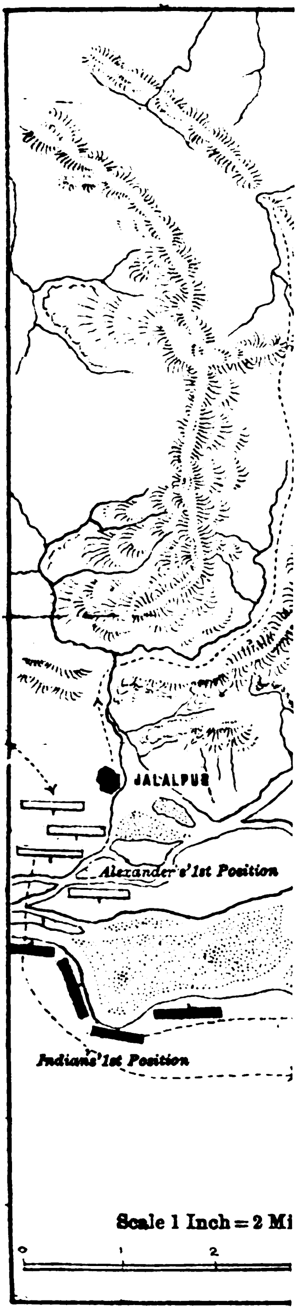

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obedience to orders previously given, crossed the river with the main body of Greek infantry, and falling on the flank and rear of the enemy completed its destruction. The battle, it may be observed, was fought almost exactly on the ground of Chilianwalla, the Greeks, however, facing to the south and the Indians to the north, so that the well-known distich—

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is literally true. I daresay it may often have occurred to many of those here present what a much more formidable thing an ancient battle was, in some respects, than a modern one. A modern battle, indeed, is serious enough; the din, the smoke, the rattle of musketry, the thunder of the artillery, the crashing of shells, which if they do not so much damage at any rate make a great deal of noise and have a tremendous moral effect, death and wounds on all sides, from foes seen and unseen: all this makes presence in a battle a great event in a man's life. But in the battle of old days the very absence of noise, except the words of command, the tramp of men and the clashing of armour, above all the closeness of your adversary, must have been still more of a kind to try the nerves. It is said, indeed, that we are going back to a clear atmosphere and comparative quiet; a smokeless powder has been discovered, and we are promised a powder which will explode without making any noise; and when these inventions are perfected, a modern battle-field will offer very new experiences. What, however, we shall never get back to is hand-to-hand fighting at close quarters. And it was this that made a battle so decisive in olden days, and which was the cause of the tremendous slaughter that used to be the fate of the beaten side. An ancient battle was really a very short affair. No doubt a good deal of time was consumed in marshalling the troops and bringing them into action; there was a good deal of preliminary skirmishing on the part of the cavalry; and the battle was usually prefaced by archery practice by the light troops on both sides. But when the infantry actually engaged, the business must have been decided in a very few minutes. The fact is that when two men or two bodies of men meet with sword or spear, a prolonged contest, of the kind for example represented by the two sons of Mr. Vincent Crummles, is from the nature of the case impossible. Once two bodies actually close on each other hand-to-hand, whether infantry or cavalry, the affair is over; one side gives way, and then woe betide the one which does so. Now-a-days only cavalry meet hand-to-hand, and not often they. When the battle is lost, a large part of the army is already at a distance and gets off unharmed. The man who fights and runs away may live to fight another day. But there was no escape for the man in armour, and when he turned his back, his shield was no defence. You may remember that at the battle of Cannæ, when the Carthaginians caught the Romans in rear as well as in front, and got them into a mob, eighty thousand legionary soldiers, practically the whole army, were killed on the field, with scarcely any loss on the Carthaginian side. And the same thing happened with the army of Porus: the cavalry were destroyed, 20,000 out of 30,000 infantry were killed, and all the chariots and elephants were captured. The loss of the Greeks was only 300. Now-a-days the loss on the winning side is often as great as on the beaten side, sometimes greater, notably, for example, in some of the great battles of the Franco-German War. This, indeed, is the great difference between ancient and modern battles. The two sons of Porus were killed and Porus himself taken prisoner. Alexander went to meet him as he was brought in, and greatly struck with his magnificent stature, commanded him to ask what he should do for him. "That he would use him royally," was the reply. Alexander restored him straightway to liberty and the full possession of his dominions, and the two kings thereon became fast friends. The Greeks indeed were loud in praises of the Indians. Never, they declared, in all their eight years of constant warfare, had they met with such skilled and gallant soldiers, who moreover surpassed in stature and bearing all the other races of Asia. They were full, too, of admiration for the wealth and fertility of the country, and they particularly note that, besides the many opulent towns, the land was covered with prosperous villages. The Indian village community evidently flourished even at that distant period; and in the brave and manly race which fought so stoutly under Porus twenty-two centuries ago, we may recognize all the fine qualities of the Punjabi agrarian people of the present day—the gallant fellows who fought us, in our turn, so stubbornly, now the most valuable component of the Indian Empire, and the best soldiers of its Queen-Empress.

India was at this period Buddhist; but the distinction of caste was clearly marked and noted by the acute invaders, who distinguish the Brahmins, whom they termed sophists because they spent their time in disputation, and whose great sway over the people is mentioned, and the ascetics or *faqirs*, who spent their time in doing nothing, and whom the Greeks styled gymnosophists because they went naked. One of these was asked if he did not fear death. "Far otherwise," he replied, "because then I shall get rid of that loathsome companion, my body." Another worthy, who had passed several years sitting on a log, on being asked by a learned Greek in camp why he did this: "How can you spend your life better?" was the reply—which, it may be observed, contains in a nutshell the whole philosophy of the monastic life.

After the great battle on the Jhelum, Alexander continued his march to the south-east, turning aside, according to his practice, to crush all enemies threatening his flank.

One such incident may be noticed. A large army, belonging to a power quite independent of King Porus, had gathered on a hill named Sangala, which has been identified with the present Sangla-walla-Tiba, about 50 miles above Jhang, in the Doab formed by the Chenab and the Ravi. Before the days of artillery, a hill furnished a great advantage for defence, and the siege of Sangala was found to be a serious operation. The position was carried at last with immense slaughter, 17,000 of the defenders. The Greeks lost only 100 killed. Sangala disposed of, Alexander resumed his march by Lahore and Amritsar, even then considerable places, across the Jalandar Doab, and arrived at the bank of the Sutlej, the ancient Hyphasis.

Here he halted to refit his army before advancing to the conquest of India, and it is recorded that he sent to Greece for twenty thousand fresh suits of armour. This incident suggests the completeness of his transport system. A suit of armour and arms probably weighed three-quarters of a maund, and we may assume that with the arms a good many other articles were indented for at the same time. Altogether we may take it that the requisition was for not less than from 20,000 to 30.000 mule-loads; 30,000 laden mules to be despatched from Macedonia to the Sutlej! A large order. And this suggests another consideration. Alexander's army on the Sutlej was 50,000 strong; how about his lines of communication? During the late Afghan war over 50,000 men crossed the frontier, yet I believe the general had never at any time more than 10,000 men in hand at the front; the rest were swallowed up in holding obligatory posts and keeping up the line of communication. Now, if 40,000 men are needed for this purpose to keep 10,000 effective in the front, when the distance to be covered was only 200 miles, what would be the force required to secure the line of communication between Macedonia and the army halted on the banks of the Sutlej? The answer is to be found in the system of war pursued by Alexander. Greek generals and garrisons were left at certain points on the road; and where complete submission was made, the enemy was left in possession of his country and converted into an ally. But where the resistance was obstinate, Alexander left no enemies behind. The formula was a simple one, and is repeated over and over again: the men were put to the sword, the women and children were sold into slavery. Sometimes mercy was extended to the men; their lives were spared and they too were sold as slaves. To appreciate the horror of ancient war we must remember that the slave population thus created were not an inferior race, African savages little higher than the more intelligent animals. Even the inhabitants of the Greek cities which covered Western Asia were liable to this fate: and the most cultured and keenest-witted race the world has ever seen—the man who might one day be discussing in the public garden of his city the philosophy of Plato, or witnessing at the theatre the tragedies of Æschylus—might on the next be doomed to spend the rest of his life deprived of almost every attribute of manhood.

And who can adequately describe the fate of the women and children? We can readily picture to ourselves, from the descriptions handed down to us, the ordinary aspect of an ancient camp; the disciplined watch-and-ward, the orderly arrangement of the lines, the standard set up before the general's tent, the measured tread of the sentries all round. But there must have been another aspect, too, especially in the case of an army which, like Alexander's, had kept the field for many years. Outside the camp the large *bazars*, the crowd of sutlers and persons of all sorts following the army, the dealers in loot, above all the attendant slave-dealers, the middle-men who bought their captives from the soldiers and took them away to resell them throughout the world. The well-known modern romance, *Salammbo*, gives a vivid account of the Carthaginian army carousing at a public banquet. We feel, when reading it, although the author had never seen what he

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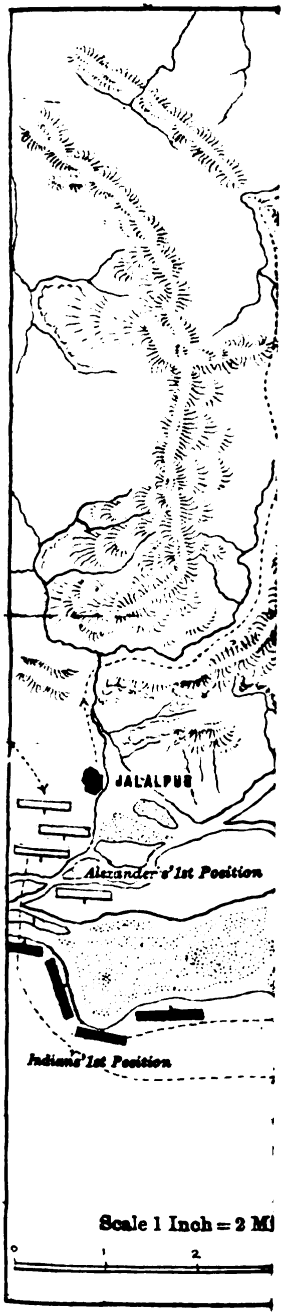

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"Swords are crossed and bayonets fixed,
First where fought great Alexander,"

is literally true. I daresay it may often have occurred to many of those here present what a much more formidable thing an ancient battle was, in some respects, than a modern one. A modern battle, indeed, is serious enough; the din, the smoke, the rattle of musketry, the thunder of the artillery, the crashing of shells, which if they do not so much damage at any rate make a great deal of noise and have a tremendous moral effect, death and wounds on all sides, from foes seen and unseen: all this makes presence in a battle a great event in a man's life. But in the battle of old days the very absence of noise, except the words of command, the tramp of men and the clashing of armour, above all the closeness of your adversary, must have been still more of a kind to try the nerves. It is said, indeed, that we are going back to a clear atmosphere and comparative quiet; a smokeless powder has been discovered, and we are promised a powder which will explode without making any noise; and when these inventions are perfected, a modern battle-field will offer very new experiences. What, however, we shall never get back to is hand-to-hand fighting at close quarters. And it was this that made a battle so decisive in olden days, and which was the cause of the tremendous slaughter that used to be the fate of the beaten side. An ancient battle was really a very short affair. No doubt a good deal of time was consumed in marshalling the troops and bringing them into action; there was a good deal of preliminary skirmishing on the part of the cavalry; and the battle was usually prefaced by archery practice by the light troops on both sides. But when the infantry actually engaged, the business must have been decided in a very few minutes. The fact is that when two men or two bodies of men meet with sword or spear, a prolonged contest, of the kind for example represented by the two sons of Mr. Vincent Crummles, is from the nature of the case impossible. Once two bodies actually close on each other hand-to-hand, whether infantry or cavalry, the affair is over; one side gives way, and then woe betide the one which does so. Now-a-days only cavalry meet hand-to-hand, and not often they. When the battle is lost, a large part of the army is already at a distance and gets off unharmed. The man who fights and runs away may live to fight another day. But there was no escape for the man in armour, and when he turned his back, his shield was no defence. You may remember that at the battle of Cannæ, when the Carthaginians caught the Romans in rear as well as in front, and got them into a mob, eighty thousand legionary soldiers, practically the whole army, were killed on the field, with scarcely any loss on the Carthaginian side. And the same thing happened with the army of Porus: the cavalry were destroyed, 20,000 out of 30,000 infantry were killed, and all the chariots and elephants were captured. The loss of the Greeks was only 300. Now-a-days the loss on the winning side is often as great as on the beaten side, sometimes greater, notably, for example, in some of the great battles of the Franco-German War. This, indeed, is the great difference between ancient and modern battles. The two sons of Porus were killed and Porus himself taken prisoner. Alexander went to meet him as he was brought in, and greatly struck with his magnificent stature, commanded him to ask what he should do for him. "That he would use him royally," was the reply. Alexander restored him straightway to liberty and the full possession of his dominions, and the two kings thereon became fast friends. The Greeks indeed were loud in praises of the Indians. Never, they declared, in all their eight years of constant warfare, had they met with such skilled and gallant soldiers, who moreover surpassed in stature and bearing all the other races of Asia. They were full, too, of admiration for the wealth and fertility of the country, and they particularly note that, besides the many opulent towns, the land was covered with prosperous villages. The Indian village community evidently flourished even at that distant period; and in the brave and manly race which fought so stoutly under Porus twenty-two centuries ago, we may recognize all the fine qualities of the Punjabi agrarian people of the present day—the gallant fellows who fought us, in our turn, so stubbornly, now the most valuable component of the Indian Empire, and the best soldiers of its Queen-Empress.

India was at this period Buddhist; but the distinction of caste was clearly marked and noted by the acute invaders, who distinguish the Brahmins, whom they termed sophists because they spent their time in disputation, and whose great sway over the people is mentioned, and the ascetics or *faqirs*, who spent their time in doing nothing, and whom the Greeks styled gymnosophists because they went naked. One of these was asked if he did not fear death. "Far otherwise," he replied, "because then I shall get rid of that loathsome companion, my body." Another worthy, who had passed several years sitting on a log, on being asked by a learned Greek in camp why he did this: "How can you spend your life better?" was the reply—which, it may be observed, contains in a nutshell the whole philosophy of the monastic life.

After the great battle on the Jhelum, Alexander continued his march to the south-east, turning aside, according to his practice, to crush all enemies threatening his flank.

One such incident may be noticed. A large army, belonging to a power quite independent of King Porus, had gathered on a hill named Sangala, which has been identified with the present Sangla-walla-Tiba, about 50 miles above Jhang, in the Doab formed by the Chenab and the Ravi. Before the days of artillery, a hill furnished a great advantage for defence, and the siege of Sangala was found to be a serious operation. The position was carried at last with immense slaughter, 17,000 of the defenders. The Greeks lost only 100 killed. Sangala disposed of, Alexander resumed his march by Lahore and Amritsar, even then considerable places, across the Jalandar Doab, and arrived at the bank of the Sutlej, the ancient Hyphasis.

Here he halted to refit his army before advancing to the conquest of India, and it is recorded that he sent to Greece for twenty thousand fresh suits of armour. This incident suggests the completeness of his transport system. A suit of armour and arms probably weighed three-quarters of a maund, and we may assume that with the arms a good many other articles were indented for at the same time. Altogether we may take it that the requisition was for not less than from 20,000 to 30,000 mule-loads; 30,000 laden mules to be despatched from Macedonia to the Sutlej! A large order. And this suggests another consideration. Alexander's army on the Sutlej was 50,000 strong; how about his lines of communication? During the late Afghan war over 50,000 men crossed the frontier, yet I believe the general had never at any time more than 10,000 men in hand at the front; the rest were swallowed up in holding obligatory posts and keeping up the line of communication. Now, if 40,000 men are needed for this purpose to keep 10,000 effective in the front, when the distance to be covered was only 200 miles, what would be the force required to secure the line of communication between Macedonia and the army halted on the banks of the Sutlej? The answer is to be found in the system of war pursued by Alexander. Greek generals and garrisons were left at certain points on the road; and where complete submission was made, the enemy was left in possession of his country and converted into an ally. But where the resistance was obstinate, Alexander left no enemies behind. The formula was a simple one, and is repeated over and over again: the men were put to the sword, the women and children were sold into slavery. Sometimes mercy was extended to the men; their lives were spared and they too were sold as slaves. To appreciate the horror of ancient war we must remember that the slave population thus created were not an inferior race, African savages little higher than the more intelligent animals. Even the inhabitants of the Greek cities which covered Western Asia were liable to this fate: and the most cultured and keenest-witted race the world has ever seen—the man who might one day be discussing in the public garden of his city the philosophy of Plato, or witnessing at the theatre the tragedies of Æschylus—might on the next be doomed to spend the rest of his life deprived of almost every attribute of manhood.

And who can adequately describe the fate of the women and children? We can readily picture to ourselves, from the descriptions handed down to us, the ordinary aspect of an ancient camp; the disciplined watch-and-ward, the orderly arrangement of the lines, the standard set up before the general's tent, the measured tread of the sentries all round. But there must have been another aspect, too, especially in the case of an army which, like Alexander's, had kept the field for many years. Outside the camp the large *bazars*, the crowd of sutlers and persons of all sorts following the army, the dealers in loot, above all the attendant slave-dealers, the middle-men who bought their captives from the soldiers and took them away to resell them throughout the world. The well-known modern romance, *Salammbo*, gives a vivid account of the Carthaginian army carousing at a public banquet. We feel, when reading it, although the author had never seen what he describes, the faithfulness to nature of the picture, so vividly does he depict the seething ferocity and brutality of the mercenary soldier of ancient times when the bonds of duty and discipline were relaxed. But far more horrible must have been the scene after one of the sacks of a city by Alexander's army, when, while the bodies of the gallant defenders of their homes were lying putrefying in the sun, a prey to the vulture and dog, their wives and daughters were led out and, one by one, amid the ribald jesting and brutal comments of the soldiery whose property they were, were knocked down to the auctioneer's hammer and led off by the slave-dealers to be carried away hundreds of miles and consigned to the living shambles of the cities of the East, the most licentious community the world has ever seen. Modern war is under some aspects a brutal thing enough; but at least we are spared such contingencies as these.

But now, when Alexander was about to cross the Sutlej, an unexpected obstacle presented itself: his army refused to go further. "Look," they said, "how great the multitude of Greeks and Macedonians who set forth eight years ago, how few are left; if we go further none of us will remain to return home." In vain Alexander tried to bring them round, urging that he had shared all their labours and dangers always in the front, and promising more plunder and large grants of land when they got home. They wanted to go home at once. Finding that he could not shake their resolve, Alexander put the best face on the matter. He ordered large sacrifices to be made to the gods; and declaring the auspices to be unfavourable to an advance, he marched back to the Jhelum, where he had founded two cities, and having constructed a large fleet of boats, set off down the river, a force marching along the east bank, the main body in the boats.

It is a remarkable evidence of the populous and civilized condition of the Punjab at this time that, bordering on the kingdom of Porus, there should have been a highly organized military community, throughout the lower course of the Punjab rivers, which offered a stubborn opposition to the invader, put down by him with more than his usual severity. The defence of the modern Mooltan by the Malli was perhaps the most desperate action ever fought by Alexander. The town having been stormed, the garrison took refuge in the keep or citadel. Scaling-ladders were brought, and Alexander, in front as usual, was the first to mount. The ladder broke just as he had got to the top of the wall, and he, with only three others, stood a mark for the shower of arrows poured on them, and then leaped down among the enemy. One of the three was killed, the other two badly wounded. Alexander himself was pierced by an arrow, and fell faint from loss of blood, when the Greeks broke in at another point and saved him from death. In their rage they put all the defenders to the sword, sparing neither age nor sex.

While lying sick of his wound, a rumour reached the fleet that he was dead, and despair seized on the whole army. Alexander hearing of this ordered himself to be conveyed to the bank of the river, and as his boat was borne down towards the camp, he ordered the cover of his royal pavilion to be raised so that he might be seen by the whole army, Even then they thought the barge was bringing his dead body, till at last, as he drew near, he waved his right hand to the multitude. Then a loud shout of joy was raised. Reaching the bank, he insisted on mounting his horse, and rode through the camp amidst the acclamations of the army. Then the fleet pursued its course, the troops fighting and conquering on their way, till at last the mouths of the Indus were reached, which river the Greeks had at first supposed to be the head of the Nile, on account of the crocodiles they found in it. Here they were greatly astonished at the phenomenon of the tides, seen by them for the first time. They arrived at the coast during the height of the south-west monsoon. Some months were spent in fitting out the fleet and in numerous expeditions by land throughout Sind, extending as far as the Ran of Cutch. Then when the cold season arrived and the north-east monsoon Alexander despatched as large a part of the army as the fleet would hold, under Nearchus, one of his best generals, up the Persian Gulf, and led the remainder in person in the same direction by land. The difficulties to be encountered in this march, of which he was warned, only determined him the more on the enterprise, to show, he said, that no country was unpassable by such soldiers, led by such a general. We may well believe the historian that all the hardships endured by his army in their ten years' campaigning were not to be compared with those they underwent in that march through the deserts of Gedrosia. Hitherto, although frequent reference is made to the cold and snow encountered, especially in the campaigns on the Oxus and the Hindu Kush, nothing is said about the heat encountered. Now for the first time this is dwelt upon, and we may well imagine what must have been suffered from this by troops clad in armour, and to whom the *sola-topi* was unknown. We may remember, indeed, that they were not men from the cold North, but Greeks or Asiatics. Yet the march through the deserts of Gedrosia, as this inhospitable land was then called, could not be made by any troops without tremendous loss. All the transport animals died except such as were killed for food; great numbers of men died also from heat and thirst; stragglers fell out and were never seen again. Thus the army struggled on in daily diminishing numbers, suffering torments, but Alexander always marching on foot at the head, "that the troops might the more patiently endure those hardships which the general suffered in common with them." At last after a three months' struggle they reached a more fertile country and met with convoys of supplies sent out to meet them, and the remnant of the army reached Persepolis. Two years later, while preparing for fresh expeditions against Arabia and other still unconquered countries, Alexander died of fever at Babylon.

Time does not permit to do more than refer to the profound influence Alexander's conquest had over the Eastern world. The result of his eight years' campaign was that the whole of this vast region became Grecianized; and this Greek civilization, although swept away by the successive waves of Muhammadan invasion and Tartar devastation, till now it is represented only by a few stray coins or fragments of broken columns, yet lasted for nine centuries, that is, as long as from the Norman Conquest to the present day. Nor can we stop to inquire how it came about, on the other hand, that the Greek conquest of Upper India exercised so little permanent influence on that country. The first and most appropriate inference to be drawn on this occasion from the wondrous story of Alexander's conquests is that the causes of this marvellous success are to be found, first, in the discipline and valour of the Macedonian army, of a young and vigorous nation starting with all the advantages of Greek civilization without Greek effeminacy, a new people bursting in on the effete and overgrown Persian empire; next, and above all, in the personal character of Alexander, who, with absolute authority and perfectly unscrupulous in using it, possessed the highest military qualities, adding to his genius for war an unbounded capacity for taking pains and undergoing fatigue, and an extraordinary degree of personal courage. Alexander's career exemplifies in the completest way the truth that for success in war the all-important factor is the general. The army may be brave and well-disciplined; but unless it has a leader of exceptional skill, energy and courage, it will accomplish nothing. Enthusiasm and a good cause will not suffice. The French revolutionary troops were glowing with enthusiasm, but this did not prevent them from being often soundly beaten by Austrians, and Prussians in turn, and they accomplished nothing enduring till men of capacity got to the leading of them. Our own history exemplifies this truth in abounding instances. We are apt to dwell on the victories of Marlborough and Wellington; but there is the other side of the picture—a long series of inglorious campaigns and ineffectual expeditions. And the cause is always the same—bad leading, an unworthy use of good material. For the material is always the same. The men of Agincourt a few years afterwards are driven ingloriously out of France; the army which was wasted in the drivelling operations of the American War was made of the same sort of stuff that furnished the heroes who fought under Wolfe—the descendants of the victors at Blenheim and Ramilies. And to turn to India, compare the campaigns of Assaye and Laswari under Wellesley and Lake, and their great results, with the wretched pottering in Southern India during the war with Hyder Ali, marchings and countermarchings without purpose or object—defeat and shame as often as victory—good troops sacrificed because without a leader. To come down to later times, compare Maiwand and the march to Kandahar. The truth, indeed, is so deeply engraved on our history that one might suppose its lessons could never be forgotten, did not history show how often they have been forgotten. It has been said that the British Government would always rather sacrifice ten thousand men than hurt a general's feelings. Certainly in the American War, to take one instance only, they sacrificed a great deal more than ten thousand men—millions of money and their great colonies—because they retained the general in command long after his incompetence had been established.

It is this surpassing importance of the general's character which, among other things, gives such value and dignity to the soldier's profession. It has been said that the military is not the highest form of genius; but no other form contributes so largely to fashion the world's history. Well, we cannot all be generals commanding armies, but the same truth holds good for all ranks. If a good general makes a good army, so does a good commanding officer make a good regiment. Why does one regiment differ from another in quality, when the material of each is the same, but because of the character of the officers and the difference in leading. Herein lies the moral of my tale, as it applies to us and our time. Alexander's army was what it was, because it trusted so absolutely in him, because his men found him always in front to lead the way in every dangerous enterprise, because he was ready for every emergency, because his energy, endurance, and courage kindled the same qualities in all ranks. Happily in our army a good general has splendid material to work with in its officers; for I believe that, whatever may be its defects in organization or its weakness in numbers, the British army is superior to all others in the character and vigour of its officers—in the present equally as in the past. I am no *laudator temporis acti.* I believe that the spirit and ability of our officers was never higher than now, and that the younger generation give the highest promise for the future. But even to British officers it may be permitted to remind them that the way to maintain a high standard is to keep in view a high ideal such as is furnished by Alexander and the greatest military commanders, and that if every man resolve so to bear himself that those under him, whether he commands a corps or a company, shall look up to him as their best and most trusted leader, an army so inspired, whatever may be awaiting it in the future, will assuredly come out brightly from the ordeal, so bearing itself as to earn the soldier's highest reward—the consciousness of duty nobly performed, the approbation and gratitude of his Queen and country.

Tuesday, October 8, 1889.

HIS EXCELLENCY GENERAL SIR FREDERICK ROBERTS, BART., V.C., G.C.B., G.C.I.E., R. A., Commander-in-Chief in India, in the Chair.

THE LUSHAI COUNTRY.

BY COLONEL R. G. WOODTHORPE, C. B., R. E.,
Deputy Quarter-Master General, Intelligence Branch.

Not very long ago the Lushais and their country were as little known to the general public as the Akas who formed the subject of my last lecture, and any mention of them would have elicited such remarks as "Never heard of them; where do they live?" &c., for the last expedition against the Lushais in the cold weather of 1871-72 has been almost forgotten and since then, till latterly, they have been fairly quiet. Last year, however, as you know, the murder of Lieut. Stewart within our own territory necessitated a punitive expedition, and the name "Lushai" again became familiar as a heading to telegrams and newspaper letters, and this winter again, operations on a large scale are to be carried out in their hills both from Bengal and Burma. I say *their* hills because I believe that all the tribes, though we know them by different names, such as Lushais, Chins, &c., are closely allied and may be considered practically as one race. The northern column of the Lushai expedition of 1871-72 reached a point, Lungvel, only 30 miles west of Fort White, and we were visited by some representatives of a tribe known as Pois, living to the south-east of Lungvel who were really, I have no doubt, what we now call Chins; for when I made an excursion to Indin in 1887 with Major Raikes, we there received a deputation of Tashon Chins, whom I at once set down as Pois. The names given to all the tribes on our north-east frontier are somewhat arbitrary and are seldom recognized by the tribes themselves. Garos, Nagas, Akas, &c., are all names given by the dwellers in the plains to their neighbours (and usually enemies) in the hills; and it is generally very difficult and often impossible to trace the origin or meaning of these names. The term "Kuki" was formerly applied generally to the dwellers in Lushai-land, but this term Mr. (now Sir John) Edgar tells us is of foreign origin, and was given to the hill tribes by the Bengalis, and he adds, "I have never found a trace of any common name for the tribe among them, though they seem to consider different families as belonging to a single group, which is certainly co-extensive with what we call the Kuki tribe." It will be impossible in the limits of this paper to touch on all the different families inhabiting these hills. Captain Lewin has very fully described them in his paper on the "Chittagong Hill Tracts," and for the purposes of this lecture, and with reference to the military operations, it may perhaps be sufficient to consider the country as inhabited on the west by "the Lushais" and on the east by "the Chins." Mr. Baker, a former authority on our north-east frontier says that the word "Lu" means "head" in the Kuki tongue, and that the Lushais may perhaps be the ruling or head clan among all the other tribes. Other authorities agree with this and say that the Lushai family supplies the other tribes with their chiefs who can only marry among themselves. Other derivations are "Lu" head, and "shai" to cut, "head cutters" (Captain Lewin adopts this derivation and says that the generic name is "Dzo"); and "Lu" head, or hair, and "shai," long, "longhaired." However, these traits are not the peculiar characteristics of this tribe but are common to all the hillmen on our north-east frontier. Mr. Baker also says the Lushais are divided into two clans, Marshai the northern and Simshai the southern; if this is so, "shai" here would have neither of the two meanings above given. "Chins" is a term given to the eastern Lushai tribes by the Burmese; it is the same as Khyens, but the pronunciation is more nearly that of the former spelling. I was told when surveying the Chindwin river that it is so called from the fact of its forming the eastern limit of Chin raids in Burmese territory.

The Lushai-Chin country (see accompanying map) may be said to lie between the parallels 92° to 94° of longitude and 22° to 24° of latitude, being a continuation southwards of the Manipur and south Cachar hills. The principal ranges of hills run generally due north and south, but between these, smaller ranges are innumerable. The hills in the north-west corner of this area are low and sparsely inhabited, but they rise gradually to the south and east till the watershed between Bengal and Burma is reached; here some of the peaks attain an average elevation of over 7,500′, one or two touching 8,000′. Between these ranges flow in deep and narrow valleys many fine streams, the principal being the Manu, the Dallesur, the Sonai, and the Barak with its tributaries, flowing to the north into Sylhet and Cachar; the Kurnafuli and the Koladyne or Kaladan (as it is now spelt) with their tributaries flowing into the Bay of Bengal; and the Manipur river, or Myittha, with its tributaries, flowing into the Chindwin. A description of the route taken by the column of 1871-72 will, I imagine, give a fair idea of the character of the rest of the country.

The country about Cachar is flat and open, but with the exception of the road to Manipur, the communications are not good, and in some places are mere tracks through the "bhils" or swamps, which abound at the foot of the hills and between the low ranges in south Cachar. The scenery all up the Barak is exceedingly beautiful, lofty wooded hills coming down to the water's edge, receding here and there so as to afford glimpses of more distant ranges, while large rocks and sandy strips diversify the character of the banks. The river winds about very much, the reaches presenting a series of pictures, the elements of which, wooded hills, rocks and water, though ever the same, are constantly varying in arrangement; and in variation of light and shade each differs from the other in some points of detail, but all are equally beautiful. Alligators bask in the sun here and there on the rocks, sliding off lazily into the deep pools beneath, when a boat approaching too near arouses them from their slumbers.

The character of the country between Mainadhar and Tipai Mukh is the same on both banks, high and narrow spurs separated by deep and dark ravines thickly clothed with cane and bamboo jungle and tall forest trees, from which huge creepers hang in graceful festoons, while between these, tangled shrubs and thorns and long rope-like roots occupy every inch of ground. Elephant tracks or obscure paths used by wood-cutters are met with in many parts of these jungles, and it was by means of these that military roads were projected. Tipai Mukh ("Mouth of the Tipai,") where the Tipai joins the Barak, supposed to be on the boundary between Lushai and Manipur was admirably suited for the camp and depôt formed there in 1871-72; a large open piece of sand and shingle on each side of the Tipai at its junction with the Barak affording ample space for all requirements. This open space is no doubt part of the bed of the river, but in the cold season it is perfectly dry. The disadvantage of the situation is that it is low and immediately surrounded by hills rising to a height of 1,000 to 1,200 feet above the river, and every evening as the sun sank behind the western ranges fog and mist slowly settled down upon the camp, remaining till late each morning. The Noonjaibong range, on each side of which flows the Barak, ends here in a very narrow ridge, whose steep sides are almost entirely covered with bamboos; and the banks both of the Barak and the Tipai are very rocky. The road from Tipai Mukh gradually ascends a spur of the Senvong hill, and on the way only a few glimpses of the Lushai hills are obtained at intervals; from a survey station, however, on the summit, a most extended view presents itself, which I shall endeavour to describe as it appeared to us one afternoon in January 1872. Looking a little south of east, the first range is the spur ending abruptly in the hill of Paburchang with every shade of "verdure clad;" beyond this are the high peaks of the northern part of the Kholel range and the spurs of Burpinglong, in which the dark green foliage is broken and relieved in many places by the sandstone and red clay of which these hills are formed. In the distance is faintly seen the northern peak of the lofty Lungleng; south of these and above Paburchang the hill of Chepui appears brown and grey from the numerous *jums** which cover its face and the long level spur, on which stood the village of Chepui, which had from this standpoint the appearance of being strongly stockaded; an appearance, however, which is deceptive, and on a nearer approach it is found to be due to the small fences with which nearly every house is surrounded. Beyond Chepui bluff Surklang stands boldly out against the sky, and extending south from Surklang, Moothelen, and Lengteng, are lost to sight behind the higher portions of the Kholel range, on which is visible the site of Vonpilal's great village, where still stands his tomb, a black speck on a long bare yellow ridge, forming a landmark for miles around.

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* *Jums* = fields.

The slopes of this range are much cut up by narrow spurs running down on either side to the Tipai. Looking down the valley of the Tipai the scene is closed by a lofty remarkably-shaped hill, sloping gently eastwards, but terminating abruptly and precipitously on the west: this is known as Momrang. The southern hills are hidden by the near range of Vanbong, a long level mass, with broad spurs, from which much of the forest has been cleared for the villages and *jums* of the people, who, on Vonpilal's death, removed thither from Kholel; but to the south-west and west Chelfil, Peak L, Noongvai, and Rengtipahar, stretch far away, range upon range, till lost in the golden haze of the afternoon sky. Just beneath the station on Senvong the road turns down a steep spur and soon finds itself once more in the depths of the lofty bamboo jungle which clothes the banks of the Tuibum. Between Tipai Mukh and the Tuibum, near the sites of old villages, many fragrant limes and walnut and cinnamon trees were discovered.

The camp on the Tuibum was in a low unhealthy situation, but the scarcity of water on the higher ground prevented the establishment of a large camp and depôt for stores anywhere but on the banks of this stream. The road between Tuibum and No. 8 camp crossed Paburchang and descended to the Tuitu: the banks of this little river are covered with bamboo, and a very tall, graceful, feathery reed. I may here mention that bamboos flourish in the neighbourhood of every stream till we cross the Moothelen range, after which the general levels are much higher and the bamboo is seldom met with. The path from the Tuitu ascended steeply through old *jums*, in which wild heliotrope, coxcomb, and other flowering weeds flourished in great luxuriance. Between Kholel and Chepui, the Tipai is still a big stream, flowing rapidly over, and between, immense rocky boulders; the path thence to the village of Chepui ascends through some *jums*, and then becomes very rocky and difficult, precipitous masses of rock overhanging it, small streams and miniature waterfalls occuring many times during the ascent.

The Chepui hill consists of three high peaks in a cluster, the northern slopes descending precipitously to the Tipai; one spur is sent out to the north, on which is built the village of Tingridum; to the south-west and south, long level spurs extend; the longest runs due south for about 10 miles, where it joins the Lengteng range. From Chepui we got a very fine near view of Surklang, Lengteng, Moothelen, and also of the Lungtul and Lungleng ranges. All these present features strikingly different from the western hills, being much more rocky and less covered with forest, long grass taking its place. Lungtul, which is perfectly square topped for some distance, presents the appearance of an almost perpendicular buttressed wall, the buttresses being represented by a few sharp steep spurs; trees appear only near the summit, and the rocks peep out through the grass in a series of regular horizontal strata. In Lungleng, large and wooded spurs alternate with the steeper faces; in the latter the horizontal strata of rock are again visible; in Surklang, however, these strata are more or less inclined, often lying nearly parallel to the general slope of the spurs and ridges.

This curious hill, or rather mass of large hills, the highest peak of which is nearly 7,000 feet, tossed about in wild confusion, would appear to have been thrown up during some great convulsion of nature. On the south-eastern spur of Surklang is the village of Taikum, which was destroyed on the 20th January 1871. From this village and the approach to it an extensive view over the eastern hills was obtained, some high mountains, towering far off on the horizon appearing to belong to Burma. On the nearer and lower ranges were many villages: those dependent on Poiboi, some of which, Mr. Edgar tells us, went over to Manipur. South of Kungnung our way lay along the western grassy slopes of Moothelen, crossing two or three very rocky streams, and going over the saddle which connects it with Lengteng, descended to the Tuignan, a very pleasant little stream, with a gravelly bed, running through a flat piece of ground, with an elevation of 2,500 feet, and covered with very fine forest trees.

The country for the rest of the route was much more open, the soil was less fertile than heretofore, and on the grassy slopes the bracken abounded. The road between Tuignan and Sellam led up the side of the Lengteng hill and over a very high rocky precipice, down which a little stream dashed with force; a little further on, descending into the valley of the Tuiva to the right of the path, a magnificent face of weather-beaten rock was visible, extending for about 100 yards, with a height of about 400 feet; on the other side of the Tuiva we came upon a large flat grassy patch of land of a similar character to many which we afterwards passed through or saw, but which we had not hitherto met with.

The group of villages known as Sellam or Chelam, as some of the natives pronounced it, is built on the southern slopes of a range of high peaks, which, rising some 300 feet above the villages, protect them from the northerly winds. The bleak sides of these hills are covered with the stubble of old *jums*, blackened stumps still standing and huge trunks of trees lying about in all directions. The view looking south and east on a fine day, is magnificent; an endless sea of peaks stretching away as far as the eye can reach, lighted up by a thousand soft and delicate tints; and nearly due south, distant some 14 miles as the crow flies, Dilklang and Murklang towering above their fellows, like too giant warders, guard the entrance to Lalboora's country. Between these and Chelam lie many deep valleys and many high ranges, the sides of which are cut up by numberless gloomy gorges and dark ravines. Very drear and threatening does this country look on a stormy day, and very cold was our camp at night and in the early morning often we went out to find the ground about us white with hoar frost; but during the day usually the sun came out warm and bright, tempering the sharpness of the east wind.

Beyond this point we found ourselves in the land of pines, rhododendrons and oaks. The march from Chelam took us through Rahmung, a pretty little village perched on the very edge of an immense precipice, and thence through the grassy valley of the Dimkai up through the village of Tulcheng, and so over a spur of Dilklang down to the valley of the Tuitao, here a tolerably wide stream flowing through a flat alluvial valley; the path crossed and recrossed this stream several times for about 5 miles when it commenced to climb the high hill of Murklang, crossing it nearly at its highest point at an elevation of 6.860 feet. The eastern face is very steep and precipitous throughout; the path by Enjow's village runs along the edge of a rocky precipice, clothed here and there with trees and grass, with a sheer descent of some thousand feet. Beneath nestles a small village, and beyond is a broad and smiling valley, through which, far below, like a silver thread, the Tao winds its way. The beauty of the scene was heightened by the rhododendrons, which clothed the hill on each side of our path, and which were in their full glory of rich crimson blossoms, and by the tall pines which shed their sweet fragrance on our path as we descended the valley of Chumfai.

This is the largest valley we saw, and is about 5 miles in length, and has an average width of about a mile; it has an elevation of 5,000 feet, and the hills immediately surrounding it rise to a height of about 1.200 feet above it. This valley seems once to have been a lake, and the process by which it has filled up seems to be described in the following words by Captain Pemberton in 1835, as that going on in the case of the Logtak lake in Manipur. "The bed has begun very perceptibly to fill up from the deposits of silt from the surrounding heights, which are continually carried into it; and, if this progress continues, a few years will suffice to obliterate the lake." Major McCulloch says: "since 1835 the lake has very visibly filled up. There runs in the lake a range of low hills, the portions of which not covered with water form islands." This was written many years ago and the process is still going on. These words might have been written of the Chumfai valley which is still swampy in places, and the surface of which is dotted over with low hills covered with leafy trees, now apparently isolated, but which evidently at one time were the peaks of a low range similar to that existing in the Logtak lake. A small stream meanders through the Chumfai valley.

From Chonchim, and the heights west and south of the valley a good view is obtained of the surrounding country, that to the south and west is very difficult to make out, being broken and confused, and not presenting the parallel appearance of the northern ranges; the various peaks of the latter are also very difficult of recognition from these points of view.

The word "tui" will have been observed to occur frequently in the names of rivers. This word means "water" generally. Mr. Edgar tells us that *Tui-tao* means the "sitting water," in reference to the comparatively level course of that stream. I was unable to find out the meaning of the names of other rivers or streams.

At the foot of the hills and low down in the ravines we find usually plenty of water, but on the higher ranges near the tops of the ridges the water supply is very small, even in the neighbourhood of large villages, as the Lushais do not mind going long distances to fetch it; and as they seldom bathe, they do not require very much. In endeavouring to improve the water supply in the neighbourhood of our camps by digging wells, &c, I was much struck by finding near the villages two streams of water, one tolerably clear and bright, with small pools formed here and there, the other nearly stagnant, moving slowly through a mass of rank weeds and putrid soil; in one place this sluggish stream was slightly stockaded on the side furthest from the village. I think this arrangement may be part of their system of sanitation, and account for the absence from their villages and immediate neighbourhood of those unpleasantnesses which are so common in all the villages I have seen in the Himalayas and elsewhere. If this is so, the Lushais have discovered the principle so strongly insisted on by advocates of the sewage manure system at home, that sewage floated on to any soil is speedily deprived of any unpleasant odour.

I have said that the country is less densely clad with jungle and bamboo scrub as we go east, and from what I saw of the Chin hills from the Chindwin and Indin, I imagine that they are more open on the higher slopes than the country above described.

The principal trees on the lower slopes are, bamboos, India rubber, endless varieties of the mountain ash, the ilex and a tree known in Assam as the *nagesur*; also several species of oak trees, with fir and rhododendron on the higher ranges. We were there before the season of flowers, but blackberries, strawberries, violets, and several of the common English wild flowers had begun to show themselves, and in the woods the scarlet rhododendron and a species of *dak* (Butea) were in blossom. The oaks were hung with streamers of grey moss, and the trunks and branches covered with small ferns and orchids, of which there are a great variety. Cinnamon, wild ginger and other roots are to be found.

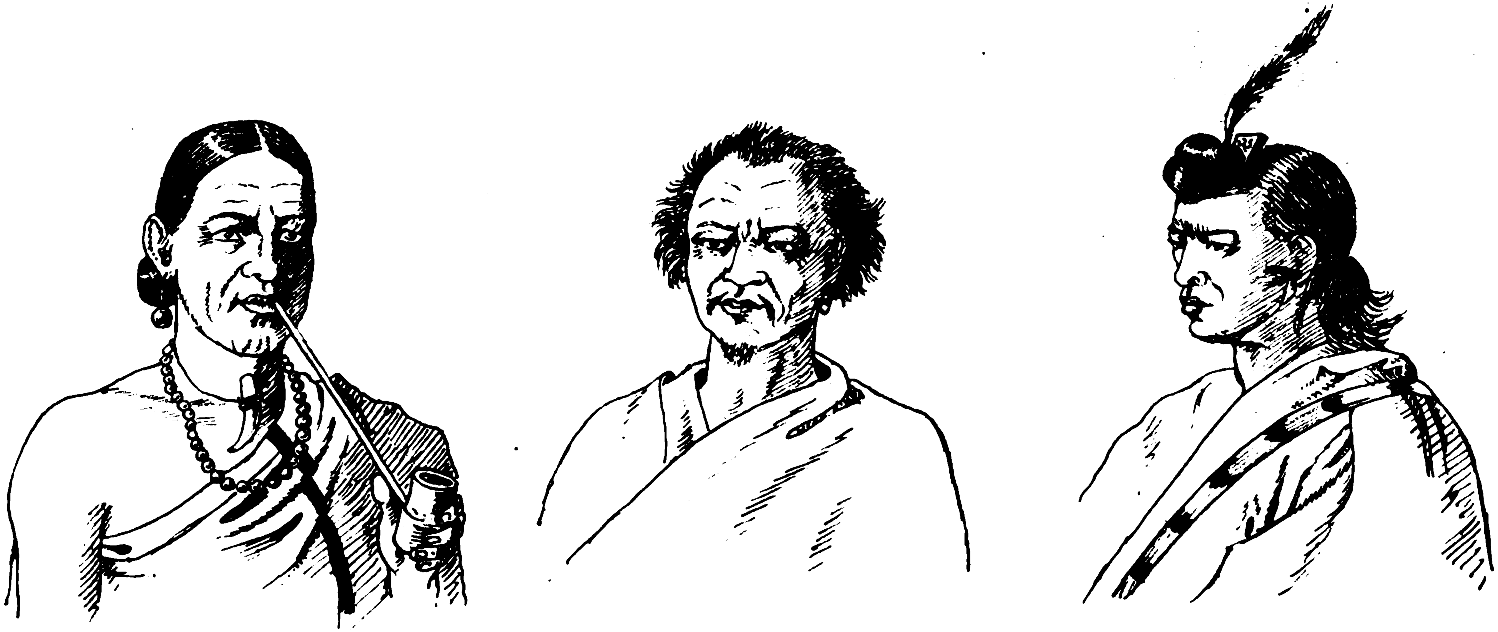
Some of the creepers which swing from tree to tree all through these forests contain good clear water, about half a pint of which can be obtained by cutting out, by two clean sharp cuts, a piece two yards long, but the water does not come unless a piece of the creeper is cut right out, the air seeming to stop the flow if the plant is simply cut through.

The country is healthy and the climate from December to the end of February delightful on the hills; there may be a little rain and hoar frost in January. In the valleys the nights and mornings are chill from the mists settling down on them, making trees and herbage damp and dripping.

These mists as a rule form only in the bottom of the valleys, and from the higher ranges they look very beautiful, like a sea of the softest wool, stretching away for miles, marking out each spur and ravine on the mountain sides like well-defined sea shores. The peaks of the low ranges stand up like little wooded islands, while currents of air below dash the mist against steep out-running spurs like mimic breakers against some bold headlands. The hills extend far away, rising range upon range, purple and blue, till the sun rising above some huge bluff, lights up the mountain sides with the most brilliant tints of orange and green, and changes the cold blue of the cloudy sea beneath into all the varied and delicate tints of mother-of-pearl, while over all hangs the clear lilac and gold of the morning sky.

This cloud effect is not peculiar to the Lushai hills but may be observed all over our north-east frontier. It frequently proves very useful

Fig. 1



LUSHAI

PAITĚ OR SUKTÉ

POI

to surveyors; for often in the garish light of day with scarce a shadow even to throw any feature into relief, the ranges and spurs get so mixed up that it is difficult to determine the courses of the valleys or the separation of the ridges, but the cloudy sea follows each outline of the spurs, and when the surveyor sees what looks like a long arm of the sea running back into the hills there he may be sure lies a large valley. By these means I have often solved some topographical problem from a distant peak, which could not otherwise have been settled except by a toilsome journey of a couple of days at least.

Captain Lewin says that the Lushais when sleeping under trees at night carefully notch them with upward nicks with their *daos*, and at dawn notch the tree downwards; by the upward notching the dew which falls during the night is absorbed by the leaves and does not drip on to the sleepers; but it is necessary to reverse these nicks in the morning in order to appease the wood spirits.

The Lushais are great hunters; "every thing" as Captain Badgley says "that runs or flies is game with them, from an elephant to a field rat, from a hornbill to a wagtail." Game is plentiful judging by the numbers of heads we saw in front of the houses. We are told that the animals found in these hills are, elephant, two-horned rhinoceros, tiger, leopard, *sambur*, hogdeer, *metna*, bear, pig, and monkey. The last is the *huluk* or howling monkey, blackfaced, grey whiskered, black bodied, and tailless, with very long arms, and of great agility. They are easily tamed if caught young and are exceedingly affectionate and docile. In the forests they are very noisy, their cry beginning with a yelp and ending with a series of jackal-like howls. Among the skulls of birds we saw cranes and hornbills; jungle fowl, partridges, *chir*, and black and argus pheasants are also met with. In the rivers are *mahsir* and a small silurus called in the north-west "sol." The Lushais use nets, and also poison the water with the juice of a plant which kills the fish without spoiling it as food; they also build dams and fishing weirs. At Tipai Mukh some officers were very successful with spoon bait, one of them, Captain Cooksley, landing in one afternoon 5 fish weighing in all 82 lbs; the largest turning the scale at 21½ lbs. Another day two officers landed between them 92 lbs. weight of fish.

The Lushais with whom we became acquainted during our journeyings belonged to three different tribes, the Lushais, Paités or Soktés, and Pois. The latter are rather taller and of a fairer complexion than the ordinary run of hillmen, but the principal distinguishing characteristic between the three tribes is the mode in which they dress their hair.

The Lushai parts his hair in the middle, and braiding it smoothly on each side of the face, binds it in a knot on the nape of the neck, secured by large copper or steel hair-pins; the Sokté does not part it at all, but wears it short and standing out like flames round the forehead, which is generally rather high and round; sometimes the hair is twisted into a little tail at the back. The Poi parts his hair at the back of the head from ear to ear, all above this line being drawn upwards and forwards, bound in a high double knot on the forehead and fastened by a small ivory or bone comb, generally ornamented with some little design in red; but all the hair below the parting is allowed to hang in wavy curls over the back and shoulders (see Fig. 1).

Some Pois once, in camp, were watching a Sikh sepoy performing his toilet, and seeing that previous to putting on his turban, he bound his long hair into a knot on the top of his head, tying one end of the turban into it, they at once hailed him as a Poi and a brother. Bearing in mind these distinctions the following description applies to all, premising that the only women we saw were Lushais.

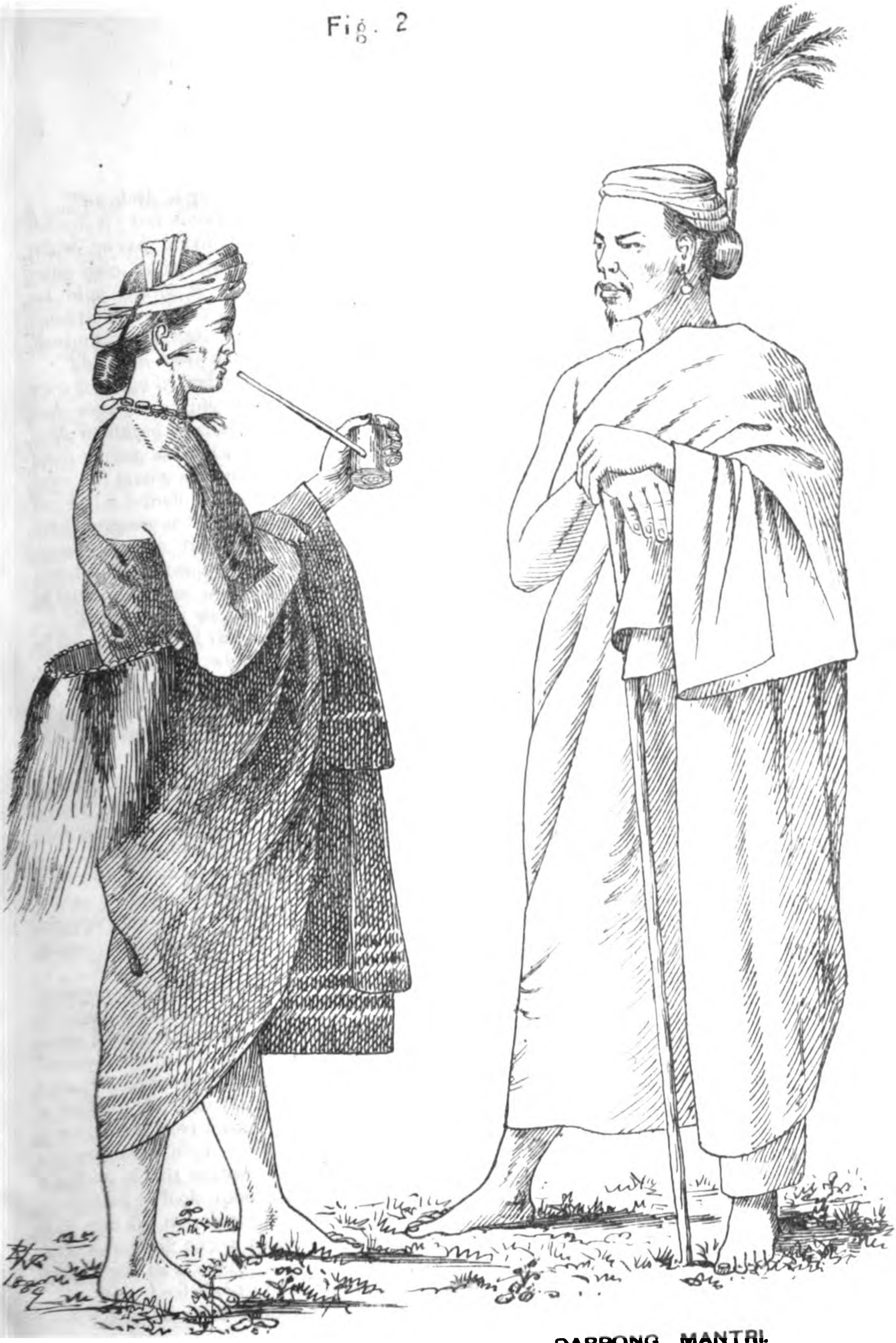
Both the men and the women are well made, and very muscular; the average height of the former appeared to be about five feet six inches, and of the women five feet four inches. The men are all sturdy fellows, thickset as to the neck and shoulders, body light and active, arms and legs muscular and well developed, their arms generally long in proportion to their bodies.

Their complexion comprises every shade of brown, and their features vary considerably; the generality, however, possessing flat *retroussé* noses with wide nostrils, thick lips, and small almond-shaped eyes. Among the Lushais though and especially among those related to the reigning families, some of whom were even handsome, we met with a much more refined type, the nose being thin and aquiline with small nostrils, the lips thin and mouth small. In all, however, the cheek bones were high and prominent, the face broad and remarkable for an almost entire absence of beard or moustache; even a slight moustache and small tuft of hair on the chin being the exception rather than the rule.

The expression of many was bright and intelligent, and they shewed a wonderful aptitude for quickly understanding anything new and wonderful which they saw during their visits to our camp. Not the least astonishing proof of this was the sharpness they displayed in understanding at a glance the intention of a pencil sketch. I showed a sketch to some Lushais one day, and it pleased them so much that one went away and returned with the skulls of a deer and a pig, and a live hen, all of which he requested me to draw, which I did; and the lookers on pointed out, on the models, each part as it was delineated, even to some discolorations on the skulls, which I indicated by a little shading. Their general expression of wonder is "Amakeh oh," which they repeat to each other over and over again, when anything more astonishing than usual excites their interest.

Their dress consists only of one large homespun sheet of cotton cloth, passed round the body under the right arm, which is thus left free, the two ends being thrown in opposite directions over the left shoulder, where they are secured by a strap of tiger or other skin, supporting a bag in which is carried a knife, a *dao*, tobacco, flint, steel, and other little necessaries. The articles contained in this bag are protected from the rain by a kind of shield, made of tiger, bear, or goat skin; the latter, with the long hair pendant, strongly resembling a Highland sporran. This shield is fastened at each end of the strap, and can be easily removed at will (see Fig. 2).

Fig. 2



A NATIVE OF CHELAM.

DARPONG, MANTRI.

The cloth is generally greyish white with a dark blue stripe running through it; but sometimes it is dark blue, with a few stripes of white yellow, or red, or all three interwoven into it. Occasionally we met a young man, apparently a Lushai exquisite, who wore both the white and blue cloths, arranged with no little taste. A few tartans have found their way among the Lushais, but these have been procured through Manipur or Cachar.

The men wear necklaces of colored beads, or of amber, which are worn in large cylindrical beads. We saw very few of the latter and those only on people apparently of some importance. A large tiger's tooth mounted in silver, and suspended round the neck by a thread, is much prized, and has, I believe, some special virtue as a charm. A large red stone, suspended by a string, often forms an ornament for the ear, but a bunch of small brilliant feathers, or a small tuft of goat's hair, dyed crimson or blue, and passed through a hole in the lobe of the ear seemed to be the favourite ornament of that organ. *Muntris* and certain other headmen are allowed to wear a tuft of feathers in the knots of their hair (see Darpong, Fig. 2).

The women we saw seemed to disdain these ornaments, but some of them distended the lobes of their ears by a small thick circular disc of ivory, wood, or white baked clay. They wear a small strip of cloth 18 inches deep, passed round the waist, and over this a cloth of dark blue wrapped carefully about them, in which they carry their young children on their backs.

Their mode of dressing their hair is exceedingly pretty; it is braided smoothly over the forehead and plaited at the sides, the plaits being passed round the back of the head and over the top in the manner of a coronet (see Fig. 3).

Men, women, and children, from the age at which they can hold a pipe, smoke almost incessantly. The men's pipes are made sometimes of brass, rudely ornamented, but generally of a piece of bamboo lined with copper or iron; a very fine bamboo being let in near the knot as a mouthpiece; occasionally they let a copper coin into the bottom of their pipes.

The bowl of the women's pipe is of clay, and is fitted with a bamboo receptacle for water (Fig 3), which becoming impregnated with the fumes of the smoke and the oil of the tobacco, is afterwards carried about by the men in small gourds or bamboo tubes, and sipped from time to time, being kept in the mouth for a short time before spitting it out. This tobacco water is looked upon as a great luxury, and when a Lushai meets a friend, he offers it to him, as a mark of courtesy, as civilized old gentlemen used formerly to exchange snuff boxes. This is also the case among the Chins. When we met the Tashons at Indin, I told Major Raikes of this custom and drew a picture of a woman's pipe. He was inclined to look upon this as a traveller's tale, but, strange to say, next day on the march we came up with a party of tame Chins and a woman was smoking one of these very pipes and told Major Raikes that the oil was used as above.

The Lushais are mighty hunters, as they are great eaters of flesh, and their supplies depend a good deal upon the success of their hunting excursions. It is only within the last fifteen years, or thereabouts, that they have learnt the use of fire-arms, but now they possess a large number of muskets, most of which are old flint-locks of English manufacture, bearing the Tower mark of various dates, some as far back as the middle of last century. The stocks of these are highly varnished and ornamented with red paint.

Their other arms are bows made of bamboo, with which poisoned arrows are used. These, however, I believe, are not much used now, having given way to the superior claims of powder and shot. Spears of various shapes and lengths they obtain from Manipur, Cachar, and elsewhere. The *dao* is a triangular blade of about 12 inches long fitted into a wooden handle. The edge is sharpened for cutting, and the broad end is employed for digging. This, besides being used as a weapon of offence, is also the agricultural implement with which most of their *juming* operations are performed.

A long-bladed two-handed Burmese knife, slung over the shoulder is carried by some with an air of superiority. Small bamboo quivers, full of *panjis*, *i. e.* small pointed stakes, of hardened bamboo, are in time of war attached to their bags. These *panjis* are stuck in the ground along the path in escaping from a pursuer, or along the approach to a village, and are capable of inflicting very nasty wounds in bare feet, and will even penetrate thick leather shoes.

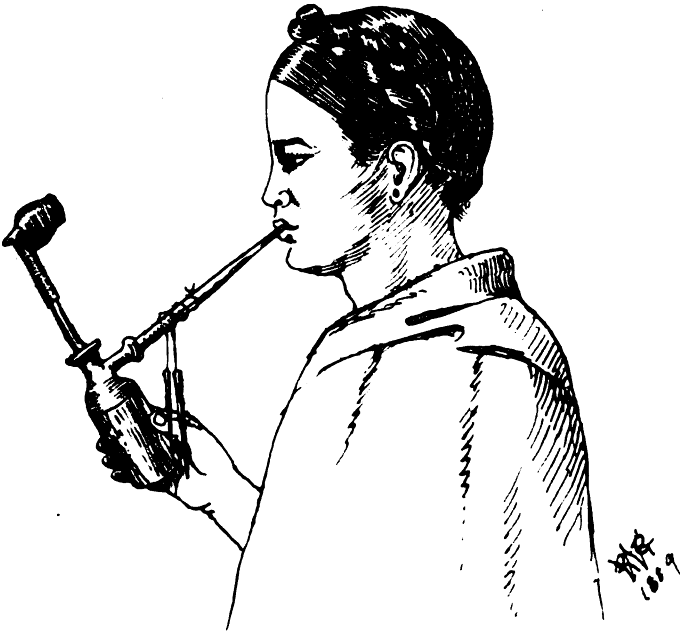
Formerly the Lushais used to obtain gunpowder from Cachar and Chittagong. Owing to the increased vigilance of the authorities in these districts, they are now obliged to manufacture it for themselves. Sulphur they get from Burma; the saltpetre they obtain from heaps of manure collected in large funnel-shaped baskets which hang up outside the houses. This manure is strongly impregnated with urine, and the liquid draining through into receptacles beneath is afterwards evaporated, and crystals of saltpetre are obtained.

Their powder is very weak, but what is lacking in quality they make up in quantity, about four fingers, or six drachms, being the usual charge. The bullets are generally bits of iron or lead hammered into shape.

Their powder flasks are made from *metna* horns, polished and ornamented with little bands of red cane-work, and sometimes inlaid with silver; the priming powder is carried in a very small horn. The Lushais have, or had, very little idea of money.

While at our camp, No. 9, we were frequently visited by large numbers of Lushais from Chepui and Tingridum, bringing in fowls, yams, and eggs for barter, the articles most coveted in exchange being cloth and salt. One day a coolie having no use for his money and being no doubt utterly tired of his monotonous commissariat fare, and small change being scarce, gave one rupee for a fowl, which thenceforth was established by the Lushais as the standard price, though, of the actual value of the rupee they were entirely ignorant, appreciating more highly a few copper coins. A few sepoys who had a supply of the latter, took advantage of it to buy back at about a sixth of their value the rupees which the Lushais had previously received from the officers.

Fig. 3.



WOMAN AND PIPE.

A Lushai village is generally situated on or near the top of some high hill or ridge. Those we saw were seldom built on the highest part but a little way down the slope, apparently for protection against high winds. The Chin villages are also on the slopes apparently. The houses are constructed on one uniform plan; they are all gable-ended and raised some three or four feet from the ground. The framework is of timber, very strong, the walls and floor being of bamboo matting, and the roof thatched with grass, cane leaves, or with a palmated leaf common in the hills.

The houses are usually about 18 feet long by 12 wide, and in front is a large verandah, fitted with hollow basins scooped out of tree trunks, in which rice is husked with long wooden pestles.

At the back of the house is another small enclosed verandah, which serves as a sort of store room. The interior of the house is fitted with a large hearth of mud or flat stones, over which is suspended a large square wooden framework on which trays of grain, herbs, &c., are dried, bacon cured, &c. On one side of the fire-place is a small raised sleeping place.

The doors are blocked up at the bottom with small logs, for a height of about two feet. This, I was told, was with a view to keep the small children in, and the pigs out. A small circular hole affords entrance to the domestic fowls; and small cages constructed just under the eaves are the abode of fowls and pigeons at night. The door itself is a close bamboo hurdle, sliding backwards and forwards inside on a couple of bamboos, which act as guides.

Some houses have windows, which are closed externally by shutters of a similar construction to the doors. The front of the house is covered with skulls of the antler deer, *metna*, bears, leopards, &c., all smoked to a dark brown colour. Feathers of various birds are also stuck into the interstices of the wall. The chief's house is of similar construction, but much larger, being about 40 yards long, by ten wide, and is divided within into one large hall, and two or three sleeping rooms opening on to a passage running the whole length of the building. It has, generally in front a large level open space, and from this the streets radiate in all directions, following the spurs or slopes of the hill.

The village is enclosed in a stiff timber stockade, excellently constructed on the most approved principles, with a ditch and banquettes in rear and loop-holed. The entrance is through a passage of strong timbers, and defended by a thick door or gate. The village of Tulcheng was surrounded by a very strong stockade, defended against escalade by a hedge of brushwood running all along the top in which were firmly secured bamboo stakes inclining outwards and downwards. The entrances were strong gates made of thick planks each cut out of one tree, with a large projecting piece left at the back through which a securing bar is passed, each plank pivotting at the top and bottom in a strong frame-work of timber. In some places the construction of the gate is ingenious, though it is not uncommon among our hill tribes on the north-east frontier. It consists of several thick uprights which swing freely from a horizontal bar passing through their upper ends. These can be easily pushed aside to admit of egress or ingress, at the same time they are quickly secured on the inside by dropping a horizontal bar across them about a foot from the ground.

Small well protected look-outs are erected at the angles of the stockade commanding the approaches to the village outside the fencing. Timber platforms surrounded by posts each crowned with the skull of some animal mark the spot "where the rude forefathers of the hamlet sleep." Inside also, these resting places are marked by a small raised mound of earth or a pile of stones and a few skulls, usually near the house of the deceased. Outside every house is a small raised platform in which the Lushais assemble in groups to smoke and chat.

In all villages is a large barn-like building raised similarly to the houses but partially open at the sides, with a square sunk fire-place in the middle; this is the house of assembly, where the affairs of the village, arrangements for raids, &c., are discussed, and travellers put up for the night.

Villages only remain in one place a few years, four or five, when the available *juming* land around is used up. This land does not recover itself for eight years, Captain Lewin says, though some hillmen have said that three or four are sufficient for ground to lie fallow.

The Lushais manufacture a kind of wine, from fermented rice and water; something else being added from the jungle, a leaf or root. These ingredients are placed in a large clay jar and pressed down for several days when the wine is fit to drink. In one village we saw the wine being sucked through a long reed which was passed from mouth to to mouth, but further south we found a kind of syphon made by joining a couple of reeds together at an angle of 45° by means of a piece of India rubber: this is used in drawing off the wine from the jars.

The Lushais like all other north-east frontier tribes are very clever at basket work, making baskets of all sorts, of cane or bamboo, from small and really tasteful ones for holding small articles indoors, up to deep large baskets with conical lids and little feet in which are carried loads of all sorts. These are carried on the back, a small cane band passing round them, and through the ends of a little wooden yoke resting on the shoulders and so over the forehead.

The domestic animals found in Lushai villages are the *gyal* or *metna*, a very handsome bovine animal with broad forehead, mild eyes and fine horns. "The tame and wild *gyal* are exactly alike in appearance and they often inter-breed. The tame *gyals* are very gentle and harmless. They are allowed to roam in the jungle all day and return at night of their own accord, when they are allowed to lick rock salt of which they are passionately fond. No ceremony of any importance can be performed without killing a *gyal* and eating the meat. It is a curious fact that a Lushai whose palate is generally not of a fastidious order looks upon milk as quite unfit for consumption, and consequently the *gyals* are not milked: they give a very rich milk I believe, though small in quantity. The skin of the *gyal* is used for making shields and drums." The Lushais also have goats remarkable for their long, white hair, pigs which are fattened to a great size, fowls, and also dogs.

Near the villages we found various kinds of traps; some formed by bending down a strong sapling or bamboo as a spring, which jerks the animal high into the air suspending it by one foot. A trap for tigers is a rough cage of logs, open at both ends, the top of which is composed of several large trunks of trees so arranged as to fall and crush any animal passing through the cage. Lushais are also very skilful in making small rat traps and snares for birds.

A *jum*, or field, is merely a piece of ground on the hill side cleared thus:—a convenient piece being chosen, the undergrowth of shrubs and creepers is cut, and all, except the largest trees, felled; the fallen jungle is then left to dry so that it may be fired when the proper season comes. Great caution is exercised in firing the *jums* to prevent the flames spreading, as at this season of the year the surrounding jungle is very dry. When fired, all the felled jungle is reduced to ashes, the unburnt trees are left lying on the ground and help to keep the soil from being washed down by the rain. The soil also is thoroughly burned for a couple of inches, and this soil being mixed with the ashes forms a kind of manure and fits the ground for the reception of the seed. Sowing takes place at the commencement of the rains. If the sowers get thoroughly soaked during the first operation, it is regarded as the happiest omen. Baskets of mixed seeds of cotton, rice, melons, pumpkins, yams, &c., are carried by the sowers, and a handful thrown into little square holes made with the broad end of the *dao*.

During the rains the women of the different villages assist each other in weeding the crops. The first thing to ripen is Indian corn, in the end of July; after, in order, melons and vegetables, lastly rice and other grain in September. Small houses, six feet from the ground are erected in the *jums* and are occupied, during the ripening of the crops by men whose business it is to protect the crops from monkeys, jungle fowl, &c. The rice having been cut and beaten out is stored in granaries fenced about with strong logs. Like the people of "Hammelin town" the Lushais are frequently visited by immense numbers of rats, which over-run everything, leaving ruin and devastation behind them.

Small gardens are frequent in the villages, in which are cultivated yams, tobacco, pepper, beans of various sorts, herbs, and plants giving an indigo dye. In carrying loads, or cutting jungle, the Lushais work to a continuous cry of "Haw-Haw" uttered in measured time by all.

Their musical instruments are few and simple; a drum of stretched deerskin, and a curious instrument formed from a gourd, the neck of which is furnished with a reed mouth-piece. Into the gourd seven reed pipes each having one hole stop, are inserted in two rows, the junction of reed and gourd being rendered air tight by a stopping of India rubber. The simple music produced is that of a few notes of a harmonium played low and softly. Another instrument is a single reed pipe, and they have gongs of various sizes. The men and boys whistle through their fingers with great power. Their songs are low monotonous chants.

Lushais are unable to swim or manage a boat. They seem to have few diseases and only one man did we see marked with smallpox.

They work a little in iron. A rough but ingenious forge common in Bengal and Assam is found in all their villages. It consists of a couple of wooden cylinders about two feet high and eight or nine inches in diameter each furnished with a wooden piston, feathers being fastened to the latter as a stuffing to prevent the escape of air. These cylinders are placed upright in the ground being buried to a certain depth. A small fire-place is constructed in front and two thin bamboos communicate under ground between this and the cylinders. The forge is worked by a man holding the pistons, one in each hand, and moving them alternately, thus keeping up a constant supply of air to the charcoal fire.

Our march through the country not being a peaceful one we had no opportunity of observing any of their religious, marriage or funeral ceremonies. However, the following extracts from the *Pioneer* which profess to be written by one personally acquainted with his subject and who has evidently thoroughly studied Captain Lewin's work on the "Chittagong Hill Tracts" may throw some light on these points.

"Each village has its chief or *Lal*, which is a hereditary title though I have known instances of self-made chiefs. The chief's house is generally in the centre of the village and much larger than the other houses. His position is curious: no outward respect of any kind is paid to him, his house is free to all the villagers. On one occasion I remember seeing a young fellow early one morning go to his chief, who was sleeping off the effects of heavy potations of rice-beer overnight, give him a kick and tell him to get up, and no notice was taken of it. On the other hand the village furnishes the chief with everything: he gets as his share of all animals killed one hind-leg and a portion of the entrails. His *jums* are all cut for him and his rice gathered in. On the war-path his word is absolute and death is the punishment for any disobedience of his orders. The chief's house is a harbour of refuge for all criminals, the only penalty being that the person doing so becomes the chief's slave for life. When a chief's son grows up his father generally first finds him a wife, and then sets him up with a certain number of his villagers and he starts life for himself in a fresh village.

"The Lushais male and female are very unclean in their habits. A bath is an unknown luxury. They are also very dirty feeders. They eat meat even in a putrid state, and the whole carcass of any dead or killed animal is eaten entrails and all. I know of no living animal that they won't eat. One *recherché* dish of theirs is a puppy who is allowed to eat his full of rice, and is then killed and eaten, rice-stuffing and all. The men and women are great drinkers. They make two kinds of liquors, one a sort of beer made from rice which is very good, and another a spirit which is very strong and nasty. Scarcely a day goes by that drinking does not take place in the chief's house. Both sexes are also inveterate smokers: their tobacco is poor stuff and evidently not indigenous, as it is known as *bay-plo*—foreign drug. The men smoke from a common bowl made from bamboo with a long bamboo stem. The women's pipes are more elaborate, being fixed on to a small reservoir into which the juice drops. This juice is poured out afterwards into a small gourd and is taken in sips by the men. The custom is, if you wish to be courteous or friendly to your neighbour or acquaintance, you ask him if he will have *tui bur*. On his accepting he pours a few drops into his mouth, keeping them between his lower teeth and the back of his tongue (the idea is that this juice kills the tartar on the teeth), and after a few minutes spits them out.

"Crime is very rare. Adultery is almost unknown, the punishment for the offence being either the death of the woman or the multilation of nose or ear. The co-respondent in these cases gets off free. The husband inflicts the punishment on his wife. Theft cases are of rare occurrence, and are settled generally by the chief who imposes a fine.

"Marriage is entirely a civil contract among the Lushais and can be dissolved by either party. A woman on leaving her husband takes with her only what she brought originally from her father's house. If a young man takes a fancy to a girl and wishes to marry, he informs his father, who sets about negotiations with the girl's parents, aided by two old councillors, who are called *pillai*, and who do all the talking and fix the amount demanded. The parents of the girl generally commence by asking a great deal, but eventually a settlement is made, the price being in ordinary cases a gun, valued at Rs. 25 to Rs. 30, and a pig or fowls. On the price being paid the pig is killed, and several big jars of rice-beer are brewed and feasting and dancing take place. On the second day the bride goes to her husband's house and they are man and wife. It may happen that a father, tempted by a high offer, gives his daughter in marriage to someone she does not like. In this case she runs away from her husband and is not thought wrong for doing so, but her father has to return the price paid for his daughter and she is free to marry again. Very lengthened periods elapse sometimes before the price of the bride is paid by the husband, and I mention as an instance an old friend of mine, Shyaltonga by name, who is the father of *eight children* and who only paid the remainder of his wife's purchase a very short time ago on receiving a large reward from me for services rendered as a guide.

"Women are held in much consideration among the Lushais, and they have much influence and are consulted on all matters. Yet upon them falls all the heavy bodily burden of fetching water, hewing wood, bringing food from the *jums*, cooking, brewing liquor and spinning. The Lushais are not prolific as a race, and seldom have more than three or four children. They suckle their children for a great length of time—up to three and four years of age. One peculiarity I have noticed, *viz.*, that a mother gives her child rice two or three days after birth, a thing I have never known among any other natives of India. She chews the rice in her mouth and puts it into the child's mouth with her tongue.

"Just before entering every Lushai village one sees groups of *machans* made of hewed logs and alongside them upright poles covered with heads of pigs, deer, *gyal* and other animals. These are the burial-grounds. When anyone falls ill and seems likely to die the *pui-thiem*,* literally the great-knower (we should call him sorcerer) is called in, and as he may direct, a *gyal*, pig, goat or dog is killed and feasted on, a slight portion being given to the sick man who may or may not recover. In the event of a goat being the animal killed, a small portion of its skin with hair attached is tied round the sick person's neck. If the sick person dies all the relatives are called in, and according to the family's means pigs, &c., are killed and all friends and relatives are feasted. Quantities of liquor are drunk, and the next day the body is buried in the ground. If a male, with the corpse is placed his pipe, his knife, dagger or spear, and in all cases cooked rice and a small quantity of rice-beer are placed by the side of the body. In some cases, such as when the father of a family dies, the corpse is dressed in a fine cloth and propped up in the presence of all the friends and relatives, food is placed in front of him and a pipe is placed between his teeth, and he is addressed thus: "Eat and drink. You have a long journey before you."

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* The Lushais call all our doctors *pui-thiem*.

"When a chief or his son dies the ceremony is, of course more imposing. When a large and powerful Syloo chief died some years ago 60 *gyals* were slaughtered by his relatives and friends, and the feasting and drinking lasted for several months. On one occasion I myself, when visiting the Howlong chief, Sayipuia, witnessed the funeral rites of his son, a boy about ten years of age who had been dead for more than a month. I was invited into his house as I had known the boy well, and this is what I saw:—in the centre of the room was a coffin roughly hewed out of a tree in which the corpse lay. The top had been plastered with mud to make it air-tight and from the bottom of the coffin through the floor of the house ran a large bamboo tube which was buried deep in the ground. By the coffin was a gun, and close to it sat the poor mother weeping and calling on her son by name. At times she would turn to me and say: "Brother, you knew my son and he called you father, and now he is dead." I was much affected, and according to custom I purchased a goat and killed it in honour of the dead. To continue, however. The corpse was kept in this coffin in the house for five months, during which time Sayipuia never left his house, never ate rice or meat. At the end of the five months the bones were taken out and removed to the family burial-ground. The Shendus, from what little we saw of their country during the last expedition, have more elaborate burial-grounds. The graves are lined with huge slabs of stone, and slabs are also erected over the tomb; and on one occasion, in addition to the skulls of animals, two human skulls were seen fastened on poles over the tomb. When Howsata's tomb was opened out by us after burning his village during the late expedition, by his side was laid Lieutenant Stewart's gun, the chief's pipe, knife, a bottle of liquor and a small head-dress made of the tail feather of the *bhimraj* bird.

"The Lushais as a race may be said to be free from any infectious diseases. They suffer from remittent fever, boils and inflammation of the bowels brought on from over-eating and over-drinking. They, in the year 1861, brought back cholera with them from a raid they made in British territory, and thus spread the greatest terror among them, many of them, I am told, blowing out their brains on the first appearance of the disease showing itself. They named cholera *vay-dam-loh* (foreign sickness). In the same way they once caught small-pox in the Kassalong *bazar* in 1860.

"A very curious fact is that the Lushais have absolutely no knowledge af any drug or medicine in any form whatever. This I look upon as most extraordinary, and I have never heard of any other tribe, however savage it may be, without any knowledge of such. The Chakmas, Mughs and Tipperahs, who though to a certain extent civilized, still have the same mode of life as the Lushais and all have their drugs. A great many of the Lushais have, of course, heard of our medicines, and the result is that, when visiting their villages, old men and maidens, young men and old women and children with various ailments are brought to me to be doctored. I restrict myself to cases of fever. and it is simply marvellous the effect of a few grains of quinine on them. I have effected a few simple cures with the aid of quinine, chlorodyne and essence of ginger, but the climax in my doctoring capabilities was reached when a husband brought his wife to me and solemnly assured me that her accouchement was already two months overdue, and could I give any drug that would make up for lost time? I saw at a glance that the poor woman was suffering from dropsy, but looked very wise and suggested that perhaps the cares of his family, coupled with the scarcity of rice, had interfered with his powers of calculation. As I am writing this I have with some difficulty persuaded an old Lushai friend of mine to bring in his daughter to be operated on by our medical officer here. The woman is suffering from a cancerous tumor on the back of the head which is necessarily very painful, and she has with great courage given herself entirely into my hands, though I told her she would suffer pain and have to be lanced. I am glad to say the operation has been most successful.

"The Lushais have in every village one or more blacksmiths, the *thir-deng*, who is a man of some importance: he receives certain tribute of rice and other produce for his work. Close to the *zalbuk* a small shed is generally found, and in this is the forge, which is very simple but at the same time effective. It consists of two up-right hollow bamboos about six inches in diameter which are placed in the ground; into these two rammers made of bird's feathers, with handles attached, when pulled up and down act as bellows on the channel made at the foot of the bamboos (see page 28). The Lushais have learnt all they know of blacksmith's work from Bengali captives and the trade has been handed down. They can repair the locks of guns, can make spears, *daos* and knives, and I have heard, though I cannot vouch for the accuracy of it, that they have been known to turn a Snider rifle into a flint-lock. Brass they can also work slightly in, the stems of all the women's pipes being made of an ornamental pattern in brass, also the handles of knives. Then, again, the bowls of the men's bamboo pipes are often lined with copper made from pice procured in the *bazar*.

"The Lushai's knowledge of pottery is confined to making cooking pots and huge big vessels for making rice-beer. They are made of a blackish clay and are very strong and rarely break. The liquor vessels are made nearly an inch thick and about two feet in height. They have wooden platters for their food and wooden or bamboo spoons. They make all kinds of very fine basket work with split cane and bamboo, and are very ingenious in making devices. It is astonishing what a complete feature in the life of all the Chittagong hill tribes the bamboo is as well as the cane. I may mention here a few of their uses. First, the houses are nearly all bamboo, the roof being of cane leaves ; the water is fetched by the women from their springs in hollow bamboos; from bamboo they make spoons, rice-sifting baskets, baskets to carry loads, baskets to hold their household goods, baskets to hold fowls ; they use bamboo root to make handles for their *daos* ; when in the jungle they even cook their rice in green bamboos ; and last, but not least, they eat the bamboo shoots, and very delicious they are.

"The Lushais give to the name of the Creator the word Pathien, who is supreme. After him comes Khua-Vang, who carries out the Pathien's orders and appears on earth at certain times. I give a story of the appearance of Khua-Vang as it was told me by a Lushai. He was sitting drinking in the chief's house and found he could not get drunk, which perplexed him. On returning to his house he saw a man whom he knew to be Khua-Vang by his enormous stature. He addressed him in fear and trembling but received no answer, and as he watched him Khua-Vang became smaller and smaller till he dwindled into space. Soon after this his village was raided and an enormous number of captives taken, men and women slaughtered, and the chief's power completely broken. The Lushais further believe that besides the Deity the sun and moon are gods and that the worship of them is agreeable to the Deity. Their ideas of an after-world are very quaint. There are two abodes, the Piel Ral abode and the Mi-thi-Khau (people-dead-village). These two are separated by the big river Piel, from which Piel Ral takes its name. Piel Ral answers to our heaven, and no one from either abode can cross the river. Mighty hunters and great warriors only go to Piel Ral, where they live at ease and have no labour of any kind : they hunt and enjoy themselves. No woman can go to Piel Ral, but small children of both sexes who died before they had left their mother's breasts are exceptions to this. To the Mi-thi-Khua go all men who have in no way distinguished themselves and all women. Life here is much the same as on earth, they have their daily labour and household duties, &c. In both abodes all live and die three times. After the third death the spirit becomes mist, falls to the ground, and with it is extinguished for ever. The idea is that when people on earth become sick and die Khua-Vang is slowly but surely eating all the flesh from off their bodies and death is the result, the spirit going to one of the two mentioned abodes.

"Every chief has one or two, or in case of big chiefs three or four, old men who act as his councillors and ambassadors : these are called by them *koubal* and by us *karbaris*. On entering a chief's village the custom is to go to the *karbari's* house and there wait until the chief demands your presence. These *karbaris* are held in great estimation and receive a yearly tribute of rice from the village. I have heard of a custom, answering much to the fiery cross of the old days : when a chief wishes to collect any of his clan or give emphasis to any order he gives his spear to the messenger. If a hostile message be intended a fighting sword is sent with the messenger. Another form of expressing orders is a small cross made of split bamboo wands which can signify various things. If the tips of the cross be broken a demand for blackmail is intended; if the tips be charred it implies an urgent assemblage at the chief's house; if a green chilli be fixed on the tip it implies disobedience to obey orders will be rewarded by punishment as hot as the chilli.

"The whole art of war among the Lushais may be described in one word—"surprise." They always send forward spies to see if their foes can be taken unawares: if the foes be on the alert they are left in peace. As an instance of this I know of a village in the south of the Hill Tracts whose inhabitants only numbered, men, women and children, about 100. The villagers, owing to a recent raid on a neighbouring village, had a night patrol. Two hundred Shendu warriors crept up to the village at early dawn. One of the sentries saw them and threw a stone at them, whereupon they all disappeared. The village, I may add, was stockaded to a certain extent.

"A raid being decided on, the preliminary step is a sacrifice and a big drink. On starting off for the raid the old men and women of the village accompany the raiders for an hour or two on their journey and then leave them with such expressed wishes as these: "May you bring home many heads and come back unhurt." On arriving at some distance from the village to be raided they make their preparations, and creep up to the village just before dawn. They generally commence by firing several shots at the village and then rush on the surprised inhabitants. I have never heard of a village thus attacked attempting to defend itself. At the first shot every man, woman and child bolts into the jungle. The women are seized, and if old and unmarriageable killed on the spot. All children too small to travel are killed and frequently torn from their mothers' breasts and murdered before their eyes. After two or three hours' bloodshed, unless the raiders feel no danger of a surprise, in which case they prolong their stay, they move out of the village, taking the women and girls captives with them, all tied together. They never take a full-grown male captive: it saves them trouble to kill him on the spot. As a rule the heads of all slain are carried off, though sometimes only the scalps. On their return journey the captives endure many hardships: if anyone through weakness or ill-treatment cannot keep up, instant death is the result. When nearing their village the raiders are again met, if successful, by all the women and old men, who bring them down cooked food and liquor and accompany them in triumph to their houses. On entering the village one or more captives are always sacrificed as a thanksgiving offering. the booty is divided and the captives are set to work as slaves. As a rule after they have been a short time in the village they are well treated. The women invariably marry from among their captors, and have been known, when offered release years after, to cling to them and refuse to go back to their own relatives.

"One extraordinary custom among the Lushais which I would not have believed had I not had personal knowledge of the fact is that men and women change their sex in all outward appearances and customs. I give as an instance a woman who has twice accompanied a chief to see me and who is dressed as a man, smokes a man's pipe, goes out hunting with men, lives with them and has in every way adapted herself to the habits of men. She actually married a young girl, who lived with her for one year. I myself asked in the presence of several chiefs and other Lushais why she had, being a woman, become a man. She at first denied being a woman, but when I suggested that we should change coats she demurred and finally confessed she was a woman, but that her Khua Vang was not good and so she became a man. I have heard of other cases in which men have adopted the dress and customs of women.

"Constant disputes arise among the chiefs, regarding their necklaces of amber and other stones, which arise through inter-marriages of different clans, and I have found it a hard task sometimes to settle these disputes satisfactorily when I have been appointed arbitrator by them. Differences arise owing to sisters, brothers, wives, sons and daughters claiming portions on the death of a chief, and often ended in the old days in bloody feuds.

"The Lushais are great at songs and dancing. I give a few typical songs, translated literally:—

1.—"The long day song" runs thus:

I do not aspire for the day,
Evening dusk I want not,
Sweet girls! their speech I solicit,
Then I wish for the day again.

2.—An ode to Thluk-Pui, a famous gallant, and his mistress Dil-Thangi, a great beauty:

Walk on, walk on, Oh Big Thluk-Pui,
Walking on the cloudy plain
Far over the vault of the sky,
Go and embrace Dil-Thangi.

Powerful chiefs have their songs dedicated to them and the various clans have their songs, all of which are sung on the occasion of big feasts.

"One of the great difficulties in gathering genealogical tables, &c., is the extraordinary way in which the relatives of two chiefs who may be at distinct enmity with one another intermarry, and also the migrations of chiefs and their followers from one clan to another distinct clan. Broadly speaking, I would classify these tribes as follows:—all west of the Koladyne I would call Lushais and east of it or across it Shendus. These, again, can be classified. The Lushais consist of Syloos and Howlongs and Tanglowas, but have living in their territory Punkhos and Bunjogis who are distinct offshoots of the Shendus. The Shendus consist of Molien-Puis, Thlang-Thangs, Lakhers, Halkas, &c., under the general designation of Pois. The main difference in the appearance of the Lushais and the Shendus can be seen at a glance. The Lushai men and women wear their hair tied in a knot at the back of the head, while the Shendus or Pois, as they are called, wear the hair tied in a huge knot right over the forehead: the latter in the case of men only. The languages are totally distinct also, but the Lushai language is, I believe, understood as far as the west border of the Chin country in Burma. One thing has struck me as being most extraordinary, and that is how rarely one meets a really old man amongst these people. Old women I have seen in abundance, but, from what I can judge of their ages, I should say that a man of over 65 years is most uncommon.

"Taking the Lushais as I have found them in their own villages they are far superior to many savages one reads about. They are most hospitable, and I rarely enter a house in any village without being offered food and drink, even when I have known myself at times the person offering it has barely enough for his day's food. They are extremely intelligent and quickly master the meaning of anything said to them or shown them. In fact it is most difficult to reconcile their apparent mildness with the well-known instances of the atrocities committed by them when raiding. One of my old friends and guides, who is now the father of a grown-up family of eight children and who is apparently an exceedingly mild and benevolent old gentleman, astonished me very much the other day when I questioned him about the feats of his youth. I led him on gradually, and eventually he told me he had with his own hands speared and killed six persons. I asked him if they were men or women, and he then told me three were men and three were women. I got an account of the death of each one from him, his features becoming gradually more ferocious as he continued his narrative till, finally, when he described how his last victim had been a woman whom he had speared in cold blood, he became quite excited and with a piece of stick in his hand enacted the whole performance over again. He gradually subsided, but no amount of expostulation on my part would convince him that he had behaved in a way not to boast of.

"Notwithstanding it being most unpleasant at times, still I have always tried, as the most effectual way of thoroughly understanding these people, to adopt the policy of "when you are at Rome," &c , and by this means only can one get a thorough insight into the character of the people. Another good old saying I have found most effective, namely, "*In vino veritas*," and many a time by a judicious application of rum at the right moment I have wormed out information which was being kept back.

"I have given a fair outline, I think, of the Lushais and their habits and customs, and I will now content myself with giving a few anecdotes in connection with the people generally by way of illustrating their character, &c. I paid my first visit into the heart of the Lushai country in February 1887, when I went with a guard of ten men to Sayipuia's village, a chief I had heard a great deal of. I trusted to the fact of Sayipuia having previously known Captain Lewin who interviewed him in 1872 (from which time he had never seen a European), and to a certain knowledge of the language and of the Lushais' customs and habits which I had acquired in villages within our frontier, to getting if not a welcome at any rate an interview. When within a few hours' of the chief's village I left my men behind to cook and proceeded with a friendly chief to show me the way, and my interpreter. On reaching the village I marched boldly in and made for the *karbari's* house, and he informed the chief I had arrived. I waited most patiently, according to custom, till the chief sent for me, and as this was not till 9 P. M., I became somewhat anxious. All this time I was surrounded by the men, women and children of the village, who clustered round me in hundreds exclaiming in wonder at my white skin. On the chief sending for me I went to his house, and though at first he was inclined to be grumpy we soon became chatty over several bottles of rum which I produced. I spent the next day with him and gave him more rum and a small present of rupees, he giving me a handsome cloth. The third day I went away well satisfied with my visit and returned to Demagiri, my starting point, through three other Howlong chiefs' villages, in all of which I was well received. In one village, where Lallura was the chief's name, I as usual produced rum and made merry with the chief and his friends. Unfortunately I found the rum running short, and in an evil moment I had it watered on the quiet to make the supply last longer. But the chief spotted it at once, and was loud in his wrath at my giving him, as he said, "water" and not spirit. I was at my wit's end and in desperation produced my only bottle of whisky: he tasted it and, with his eyes up-raised, exclaimed: "Words are not available to express how delicious it is"—and he very soon got drunk. In his cups he boasted of his power and strength, &c., while his old warriors sitting alongside of him commenced chaffing him (he was lame I must mention from an accident to his hip when a boy) saying: "you a warrior and a chief? Why, you can't walk from one village to another" and so on. This little story shows what I have said previously, that no outward respect is paid to a chief and that they have a great craving for strong drinks.

"My next visit to Sayipuia was in December 1887. On this occasion I knew my ground better, was provided with more authority to deal with him and, last but not least, had a supply of rupees. Accordingly I asked him to swear an oath of friendship with me according to Lushai customs, and he at once agreed, and the following morning was fixed for the ceremony which took place as follows:—a *gyal* was tied in the open space facing the chief's house. Sayipuia came out dressed in his best, which was a very handsome check cloth with an enormous plume made of the tail feathers of the *bhimraj*, or mocking bird, in his hair and a spear in his right hand. He called me to him close to the *gyal*, and both of us, holding the spear in our right hands, simultaneously plunged it into the brute's ribs. Sayipuia drew out the spear and taking the warm blood in his hand smeared his and my hands, face and legs with its blood, and then holding up the spear called out in a loud voice that all might hear as follows:—"when the big streams and little streams shall dry up in these hills then and not before shall this white man be mine enemy: what is mine is his, and by this oath you all know him to be my friend."

"The ceremony over, we adjourned to the chief's house and ratified the oath in numerous flagons of home-brewed rice-beer. Now I luckily happen to possess a strong head and this has stood me in good stead, as one must drink with these people if one wishes to thoroughly adapt oneself to their customs. The drink is passed round in horns (generally a tame *gyal's*) and their principle is "no heel taps," each person reversing his horn to show he has emptied it. I was much amused on one occasion at one of these drinking bouts by Sayipuia exclaiming: "this is indeed a chief: why we can't even make him drunk." The Lushais carry this drinking to such an extent that it is a common thing for the rice of last year's crop to be exhausted before the new crop is ripe, owing to the vast quantities consumed in manufacturing their drink. As a rule the Lushais are not quarrelsome in their cups, but when they have had as much as they can stand they quietly lie down on the floor and sleep off their drunkenness. Instances of quarreling do of course occur, and I remember once, when sitting in a chief's house, one of his young warriors kept coming up to where I was sitting by the chief and bothering me to give him tobacco, to look at my arms, legs, &c., till I lost patience and told him to desist. The chief, too, seeing I was getting angry, remarked: "*Amro! he vay-lall zone-a thun-ur-in sakei-aug-bok*"—"Be quiet, these foreign chiefs when angry are like tigers." I took this as a gentle hint and landed my young friend one straight between the eyes, much to his discomfiture. To my astonishment, instead of there being a row I was applauded for what I had done, and the next day this same young fellow and I became quite friendly."

The Lushai mode of war consists of surprises and bush fighting, and their ideas of bravery are amusing. At the first fight they called out to the sepoys not to stay like cowards in the open but to come against them in the jungle like men. The Akas taunted us in a similar way. We seldom please our enemies: the Afghans at the Peiwar said our flank attack in the early morning was unfair as they expected us by day, and the Nagas have complained that we did not run away or take refuge in the jungle at the first sound of their war-cry but disconcerted them by a steady advance. The Lushais and Chins usually attack in the early morning when the fog lies low. They wait till the men go out into the fields, then unperceived slip into the village and in the resulting confusion kill and carry off as many as they can. In the Kubo valley so afraid of the Chins are the villagers that they never, they told me, sleep in the villages in the cold weather, but always retire to the jungles for the night, and always to a different spot each night. Where the villages are on a river bank, the inhabitants retire for the night to boats moored in mid stream, in little huts built on piles, as the Chins dread water, into which they never venture to any depth.

When on raids they travel with great celerity, carrying nothing but their arms and enough rice to last them for the journey. A fresh joint of bamboo at each camp serving all purposes of waterjar and cooking pot.

Muntris, or heralds, men wearing feathers and red *pagris*, are employed among these people to treat of war and peace and at all times pass free.

We may now glance hurriedly at the various raids which have been committed in our territory since we first came into contact with the Lushais, and the expeditions which have been forced on us by these raids. I do not propose, as indeed time would not admit, to go into the internal history of the Lushais, nor to dwell upon their intertribal feuds and quarrels. I must confine myself to the barest outline of the history of our own immediate quarrels with them.

We were first brought into contact with them in 1844 under the following circumstances. In the winter of 1843-44 Lassoo a chief of some importance died leaving his son Lalchokla as his successor. Lalchokla signalized his accession to power by raiding on a Manipur colony inhabiting the village of Kochabari in Pertabghar for the purpose of obtaining heads to place on his father's tomb. He surrounded the village on the night of the 16th April, and attacking it at dawn took 20 heads and 6 captives. The Raja of Hill Tipperah was requested to inflict punishment on the offenders, but he failed, or refused, to do so. Captain Blackwood of the Sylhet Light Infantry led a party into the hills on the 1st December 1844, and assisted by Lalmi Sing, a Kuki chief and cousin of Lalchokla, surrounded the latter's village and cut off his supplies. Lalchokla surrendered on the 4th December, and was subsequently tried and transported. The terms of the surrender were apparently misunderstood by the chief, and our subsequent treatment of him was regarded by the Lushais as a breach of faith on our part. It is said that he was promised that his life should be spared if he gave himself up and that this he took to mean a free pardon. There is no doubt that the memory of his fate was still lively among the Lushai hills; hence the difficulty which both columns in the expedition of 1871-72 experienced in endeavouring to induce the chiefs to come in.

In November 1849, the Lushais committed simultaneous raids on some villages in Cachar, Sylhet and Manipur, burning the villages, and killing or carrying into slavery the inhabitants, who, in the case of the Cachar villages, were members of a Lushai tribe who had been pushed onwards from the south by some more powerful enemies. A second expedition was consequently ordered in the hope that prompt punishment might prevent further raids, and Colonel Lister, Political Agent in the Khasia hills, was appointed to the command. He started in January 1850 with one subaltern, six native officers and 229 non-commissioned officers and sepoys. He succeeded in reaching and destroying the village of a chief named Mullah about 80 miles in a southerly direction from Cachar, but finding the Lushais more numerous and powerful than he had anticipated, he deemed it advisable to retire next day. However the result of the expedition was that a powerful chief Sukpilal came into Cachar on a friendly visit to the Deputy Commissioner and a small trade sprang up between the Lushais and our own frontier people. Up to 1862 our northern frontier was undisturbed and then three villages near Adampur in South Sylhet were attacked and burned, and, as usual, the villagers killed or carried off into captivity. In consequence of this, negotiations were opened with Sukpilal, and he was promised a small annual money payment if he would prevent his own people and his neighbours from raiding.

South Cachar now began to attract the attention of tea planters and several gardens were opened out, and this appears to have exercised the Kukis' minds considerably, though things remained quiet up till the close of 1868 when some villages in Sylhet were attacked, and in January of the following year, the tea gardens of Loharband and Monierkhal, in Cachar, were attacked. An expedition under General Nuthall was then arranged. Great delay occurred before the troops, which were thought necessary, had collected in Cachar. They were divided into two columns. The left composed of half the Eurasian battery which used then to be maintained in Shillong, and three British officers and 300 rank and file of the 7th Native Infantry who had to be obtained from Dacca. This column left Cachar on the 21st and 22nd February and was to proceed up the Sonai river. The right column consisted of the other half of the Eurasian Battery and 250 rank and file of the 44th S. L. I. It concentrated at Jalnacherra by the 24th February and was to proceed up the Dallesur river. A third small force composed of frontier police under Mr. Baker, the District Superintendent, started from Kumberghat in Sylhet and penetrated to the Sorphuel peak. The season was too far advanced; the rains had set in, rivers became swollen and the three columns were obliged to return without effecting anything: they were unable to reach the inhabited parts and their advance was entirely unopposed, nor were they harassed on their return march. Mr. Baker, indeed, arrived in sight of the Lushai villages and had a brush with the enemy, but with his small force and lack of supplies he could not hope to cope successfully alone with the Lushais and there being no signs of the Dallesur column, he was forced to retire, and, on the second day, received orders from General Nuthall to return. The Government were urged to despatch another expedition in the cold season of 1869-70, but this was considered inexpedient and a policy of conciliation was to be tried instead. This is a policy which has seldom succeeded with our frontier tribes, especially when, as in this case, following on a partial failure of the policy of intimidation by display of military force. For a long time was the policy of conciliation and moral force insisted on in the Naga hills, in spite of the continued protests of Captain John Butler, the Political Agent there, one of the finest and best political officers we have ever had on that frontier. The history of this policy was one, as he put it, of unprovoked aggressions and outrages on the one hand, of unlooked-for concessions on the other; with the result that we had three political officers, including poor Butler, murdered, in little or more than as many years, and one accidentally shot in one of the numerous expeditions which this policy eventually necessitated. Captain Lewin, whose experience was great, and who entertained almost an affection for the hill tribes among whom he lived for many years and of whom he writes in very glowing terms, nevertheless felt constrained to say that the only policy with these men is first the stick, then the sugar stick. We reversed the order unfortunately and we need not be surprised to learn that although between December 1869 and March 1870, Mr. Edgar, then Deputy Commissioner of Cachar, and Major Macdonald of the survey visited the Lushai country and satisfactorily interviewed Sukpilal with whom a new boundary was agreed upon, the Lushais themselves were not influenced. Next winter, *i.e.* 1870-71, Mr. Edgar repeated his visit to the Lushai hills while Major Graham. Deputy Commissioner of the Chittagong Hill Tracts, and Major Macdonald visited Ruttonpuya and the Syloos. Ruttonpuya was the chief whose territory immediately adjoins the Chittagong district and against whom an expedition under Captain Raban had been sent in 1861 with the result of reducing that chief to submission and making him our ally. Major Graham was not allowed by the Syloo chiefs to penetrate into their country. Mr. Edgar received a second visit from Sukpilal and a written agreement was explained to him and he declared himself satisfied with it and accepted all responsibility so far as it related to the country between Chattacherra and the Sonai, but said he had no authority east of that river. While this was being done outrages surpassing all previous ones were being committed. The first raid occurred in the Chittagong Hill Tracts near the Chima outpost, by a party, Captain Lewin says, of 200 strong from the Shendu tribe. On the Cachar side, on the 23rd January 1871, the village of Ainakhal in western Cachar was burned, 25 persons killed and 37 taken captive. On the same day the garden of Alexandrapur was destroyed by a party of Howlongs; Mr. Winchester, a planter on a visit to the garden, being killed and his daughter Mary, a child of 6 years of age, carried off. A few hours later the adjoining garden of Katlichura was attacked but the assailants were driven off by two planters. The following day a second attack was made with like result. On the 26th January the raiders surprised some sepoys and police in the Monierkhal garden, killing one sepoy and wounding others, and then attacked the stockade and coolie lines The guard was reinforced and the Lushais driven off with a loss of 57 killed and wounded, the loss on our side being six killed and as many wounded. An adjoining garden was also raided but little damage done. On the 27th January Nandigram was attacked, 11 persons killed and 3 carried off, and the next day the Lushais attacked a party of 8 sepoys, 4th Native Infantry, who fought very gallantly, only one man escaping; they however accounted for 25 Lushais. On the 23rd February the Jalnacherra tea garden was attacked, 7 coolies being killed and wounded. This was the last outrage in Cachar. In Sylhet, Tipperah, and Manipur however raids continued till March.

The raids in South Cachar were traced to the Howlongs and Syloos and those in the east were traced to the sons of Vonolel assisted probably by the people of Vonpilal and Poiboi. The raids in Sylhet and Tipperah were believed to have been made by Sukpilal's people including two of his sons.

Meanwhile detachments were hurried down from Shillong and brought up from Dacca for the protection of the frontier, and great anxiety was felt for Mr. Edgar's safety, who was, as we have seen, in Sukpilal's country. A detachment of the 44th Light Infantry under Captain Lightfoot was sent up the Sonai to search for him and reached his camp on the 21st February and escorted him back to Cachar. These results of the policy of conciliation were so glaring that the Government could no longer shut theirs eyes to them, and urged by the Lieutenant Governor of Bengal, the Commander-in-Chief and all the local officers, they decided on an expedition on a somewhat extensive scale and Sir R. Napier was called upon to submit proposals for a campaign. These were that two columns should start early in November 1871; one from Chittagong and the other from Cachar; each column to consist of

R. A.	... ...	½ mountain battery.
Sappers and Miners	...	1 company.
Native Infantry	...	1,500 rifles.

That while the co-operation of the Rajas of Manipur and Tipperah was very desirable, their troops should confine themselves to the protection of their own frontiers, to opening up roads, and keeping up communications through their own territories, and they did render useful aid in this way. The Cachar column was called the left column and was composed as follows:—

Half Peshawar Mountain Battery.
No. 1 Company Sappers and Miners.

22nd P. N. I.	... 500	rank and file under	Col. W. Stafford.
42nd A. L. I.	... 500	do.	Col. Rattray.
44th S. L. I.	... 500	do.	Lt.-Col. Hicks.
Police	... 100	do.	Mr. W. W. Daly.

Brigadier-General G. Bourchier, C. B., was in command with the following staff:—Lieut.-Colonel F. S. Roberts, V. C., R. A., A. Q. M. G., Captain H. Thompson, Brigade-Major, Captain Butter, A. D. C.

Dr. Buckle, Inspector General of Hospitals was in medical charge, and Mr. Edgar, Deputy Commissioner, Cachar, accompanied the column as Political Officer.

Lieut.-Colonel Davidson was in charge of the commissariat and Major Moore commanded the police corps.

A party of the telegraph department under Mr. Pitman and a survey party under Captain Badgley also accompanied the column. 1,200 Punjabi coolies were attached to this force for the commissariat, and a cooli corps of 800 men was enrolled for the sepoys' baggage. The latter were attacked with cholera on the way up. The medical and embarking authorities at Calcutta protested against the crowding of 800 men in two flats but their protest was of no avail. The coolies were not accompanied by any European officer, nor had they sufficient medical aid. The ordinary precautions to prevent over-crowding, so strictly enforced in the case of tea garden coolies, seem to have been disregarded and the result was cholera; the disease was not got under control till December and then the coolie corps was reduced to half its original number. Thus a very serious strain was at the outset brought upon the commissariat department. Fortunately water carriage was available as far as Tipai Mukh, and the Collector of Sylhet undertook to supply 300 coolies. As I wish here, in the short time allowed me, only to give you some idea of the difficulties experienced by an expedition to these hills and the kind of warfare, I confine myself to a few incidents with the left column; the experiences of the right column being very similar.

The General and staff arrived on the 29th November, at Mainadhar, the last and most outlying of the tea gardens on the Barak, which had never been attacked by Lushais, perhaps on account of the extreme difficulty of the country between it and their own border. The bamboos around supplied building materials for barracks, hospitals, officers' quarters, magazines, godowns, &c., Commissariat stores for three months were collected here, and also a fleet of small boats to convey them up the Barak to Tipai Mukh. The boatmen in Cachar and Sylhet had the greatest horror of this part of the country, and it was with difficulty that the fleet and boatmen were got together, many owners preferring to sink their boats and disappear into the jungles till the danger was overpast.

The principal difficulty experienced by this column throughout was the roads, the only communications being obscure woodmen's paths or elephant tracks, which might or might not, prove to run in the right direction. When the right direction was at last found, the track had to be converted into a road, and camps cleared at convenient halting places. Curious camps they were, generally situated in the depths of tall virgin forest, the gloom of which seemed never to have been penetrated by the sun's rays; the leafy huts hardly distinguishable at a little distance from the undergrowth; but it was astonishing how soon the howling wilderness of jungle was converted into a fairly comfortable resting place. Arrived at the halting place, all the troops went to work cutting down branches of trees and bamboos, collecting leaves, grass, &c. In this work the active little Gurkhas of the 44th Light Infantry were much more at home than their up-country brethren-in-arms, who at first looked helplessly on, while the former springing into the trees like monkeys lopped off branches, collected bamboos, and had quickly constructed long ranges of lean-tos with a low raised bamboo floor as a sleeping place, before the others had made up their minds what to do.

All the sepoys had been supplied with *kukris*, but only those possessed by the Gurkhas were of any use, those supplied by Government often breaking after the first few blows. A large number of Cachari, Mekir and Kuki coolies were with the advance, and these men were very expert in cutting jungle and building huts. In an almost incredibly short space of time they ran up quarters for the general and other officers with him. The frame-work was fastened together by strips of bark, and the walls consisted of bamboos, leaves and grass. Each hut was furnished with a standing bedstead, a table and stool of split bamboos; outside was the mess-table with a bench on either side. Abundance of fire wood was at hand, and large camp fires were always maintained which tended to keep these camps healthier than might have been expected. Natives, as a rule, are not particular as to what wood they burn and frequently thrust a green bamboo into the fire; the heat expands the air between the joints till they burst with a loud noise exceedingly like the report of a musket, which leads the inexperienced to imagine that a night attack is being made on the camp.

At one place we came upon a curious bamboo, not however uncommon on the north-east frontier, each joint, about nine inches apart, having a ring of very sharp thorns round it. In cutting these to build our huts we found enclosed between the joints of one bamboo, four little bats, alive. How long they had been there, how they came there, and how being there they would, without our assistance, ever have got out I cannot say. The joints of the bamboo certainly seemed perfectly air tight for there was no perceptible opening. On the 12th December the first detachment reached Tipai Mukh and on the 16th an advance was made with the sappers and a wing of the 44th, a wing of the 22nd being left to guard Tipai Mukh. As other troops arrived this wing was pushed on, and a continuous chain of road-making detachments extending along the whole line was formed. On the 22nd December the head-quarters, with a wing of the 44th and 50 of the 22nd Punjab Native Infantry descended to the Tuibum stream. In several places the Lushais had put up some symbols intended as warnings to the troops not to advance: one was a small model of a gallows made of bamboos, with rough pieces of wood intended to represent men hanging from it: another consisted of small strips of bamboo, stuck into the trunk of a felled tree, from the wounds of which, a deep red sap, strongly resembling blood, exuded, indicating to us the fate that awaited us if we persisted in going on. Where the path comes out on the Tuibum there was a weir of bamboo and stones, for catching fish, and on the opposite bank was a bamboo watch house raised some twelve feet from the ground. On the weir and beneath the house were some 40 or 50 Lushais. They yelled to us to turn back and made threatening demonstrations, but on our steady advance they retired without firing. Before the camping ground was reached the Lushais attempted to stop us again several times, but disappeared, and the camp was not disturbed. The next day an advance was made on Kholel to give the Lushais no chances of strengthening their position. This was the 23rd December. The ascent was through thick jungle, and very steep. Colonel Roberts was in front with the advanced guard, and as he arrived at the edge of a *jum*, a Kuki constable pointed out that there were Lushais in the *jum*-house: and as the foremost skirmishers debouched upon the *jums*, they were received by a volley from the Lushais and the constable was dangerously wounded: the 22nd then charged and the Lushais fired one more volley and disappeared. The *jum*-house was found to be full of grain, which was at once destroyed and the little force continued its toilsome ascent driving the Lushais from *jum* to *jum*. The tactics adopted by the latter were to post themselves at the top of each steep ascent in positions commanding the entrance to the *jum*, and, as our foremost men came into the open, to fire a volley at them and disappear into the heavy jungle. Their style of fighting, the steepness of the hill side, and the denseness of the forest, all favoured the Lushais and were against us. From frequent traces of blood it was evident that the enemy had suffered but it was impossible to say to what extent, as the Lushais have a superstition that if the head of a man slain in battle falls into the hands of his enemy, the man himself becomes the slave of the victor in the next world, and consequently they spare no effort to carry off their dead and wounded or to conceal them till the enemy has retired. On the other hand they spare no pains and fear no danger, in the endeavour to obtain the heads of their enemies. Three large villages were destroyed and the troops occupied a fourth after a slight opposition. The 24th and 25th were spent in punishing other villages, and on the 26th the troops returned to Tuibum: and a halt was made for some days to allow of roads being made for the transit of supplies. On the 9th January Pachui was occupied—

an important position, covering the communications with the rear, the southern portion of the valley with the village of Kholel, also the country west-ward. On the 17th a further advance was made to Chepui; the road ran down to the Tuivai (Tipai) and on the way down a great many Lushais were observed collected in a *jum* opposite. A few of them went down to the river and here the General drew up his force on the shingle. A *muntri* or interpreter (Darpong), who acted as a go-between, here arrived on the scene and endeavoured to persuade the General to halt there for the night, saying that Poiboi would parley in the darkness. These midnight parleys seem to be the usual custom among the Lushais, but the General did not feel bound to conform to their customs and a further advance was made. They then tried to pass off a slave as Poiboi but his manner betrayed him, and the column passed on to the village of Chepui. The commissariat elephants did not work beyond this point as the paths were too trying for them, and time could not be afforded for making roads for them. We encamped in a new portion of the village, and Engloom, our guide, finding a large jar of Lushai wine, we tasted it for the first time. Some of us testified our approval by such frequent applications to the jar that Engloom took the opportunity of our superintending our camping arrangements to remove it to some place of concealment and we saw it no more. Here also we saw Engloom cook a fowl. Squatting before a huge fire, he killed the bird by cutting its head off and giving a few hurried plucks to some of the largest feathers, he then flung the body into the middle of the flames; snatching it out a second or two afterwards, a few more feathers were plucked, and again it was thrown into the flames. These alternate burnings and pluckings were continued for six or seven minutes when the singed and blackened little mass was carried off to be devoured.

We cannot follow all the movements of the troops, a slight sketch of the skirmish at Kungnung and the final proceedings must suffice.

On the 24th a small stream below Kungnung was reached and the next morning the troops marched at 8 o'clock. Darpong had given the General to understand that an attack would be made in the ravine, shortly after leaving camp, and so the march was an hour earlier than usual in the hopes of surprising the Lushais before their arrangements were made, and this was the happy result. Fifty men of the 44th went in advance, then the General and his staff and the wing of the 44th; 60 men of the 22nd being left as a guard for the artillery and coolies. About half a mile from camp, as the advanced guard were climbing over a steep rocky part of the path, the first shots were exchanged and, as if by magic, along the whole line and in front, the gloom of the forest was lighted up by a myriad flashes, and bullets and slugs fell around us, "as on a July day, the thunder shower falls pattering on the way." At the first discharge the General's orderly was shot dead, and almost immediately the General himself was wounded in the left hand and arm. The sepoys replied well and the advanced guard extended as they reached the rocky ground on the left flank, while the rest of the 44th flinging down their packs and great-coats, dived into the rocky stream and meeting the enemy in their own jungle drove them up the hill before them, scattering them most effectually. Thirteen Lushais fell almost in one spot in the stream. One man was trying to escape up the face of a piece of rock over which some water trickled into a pool below. The slippery rock hindered him, and ere he could mount it a Gurkha had overtaken and cut him down with his *kukri*. He fell on his face, in the pool, looking painfully like a woman as he lay there in his cloth with smooth face and neatly braided hair and knot.

At the very commencement of the firing, a note was sent by Mr. Edgar from the camp telling the General that he had forced Darpong to state what he knew about the impending attack. His statement was that the Lushais meant to avoid the troops but to attack the coolies and artillery elephants. Two of Mr. Edgar's Cachari coolies were wounded at the outset, and this dispiriting the others Mr. Edgar determined to remain with them. Captain Thompson also remained behind. Some of the Lushais managed to slip pass the column, and as we climbed the hill in pursuit of the main body, we could hear firing below.

Collecting the scattered columns, the advance followed the Kungnung path through some open *jums*, from which we could see the Lushais running wildly about on the spurs and ridges above, apparently endeavouring to collect for a stand at the village. Further on, the path ran along the face of a huge precipice, and was commanded for a long distance by a small stockade constructed at the most difficult part of the road, where a few resolute men might have stopped the advance of an army, while a few rocks detached from above would have inflicted heavy loss on the troops passing beneath, as escape would have been impossible. At this point a fortnight later, a small hill pony, belonging to an officer, slipped and went over the path and falling 300 feet was killed at once.

The rapidity with which the advance had been conducted had left the Lushais no time to defend this stockade, but passing upwards, the path suddenly emerged on a *jum* above which, and on the high crest of another precipitous ridge, was another long stockade. The foremost sepoy on showing himself at the edge of the *jum* was at once saluted by a shot which missed him. It was found useless to try and take this stockade with a rush, owing to the nature of the ground, and so two parties of the 44th skirmished round to our right, taking advantage of some high grass which concealed them from the defenders of the stockade, who kept up a steady fire on the road, expecting every moment to see the troops appear.

The rest of the force had been halted under the shelter of a bank, till the result of the flanking movement was apparent. This manœuvre was most successfully executed and great was the surprise of the Lushais, while keeping their attention and fire directed on the path in front to find themselves suddenly taken in flank. They fled, scarce exchanging a shot with their unexpected assailants, and when the troops advanced through the stockade to the village a couple of hundred yards beyond, not a Lushai was visible, all having vanished in the forest and down the hill side.

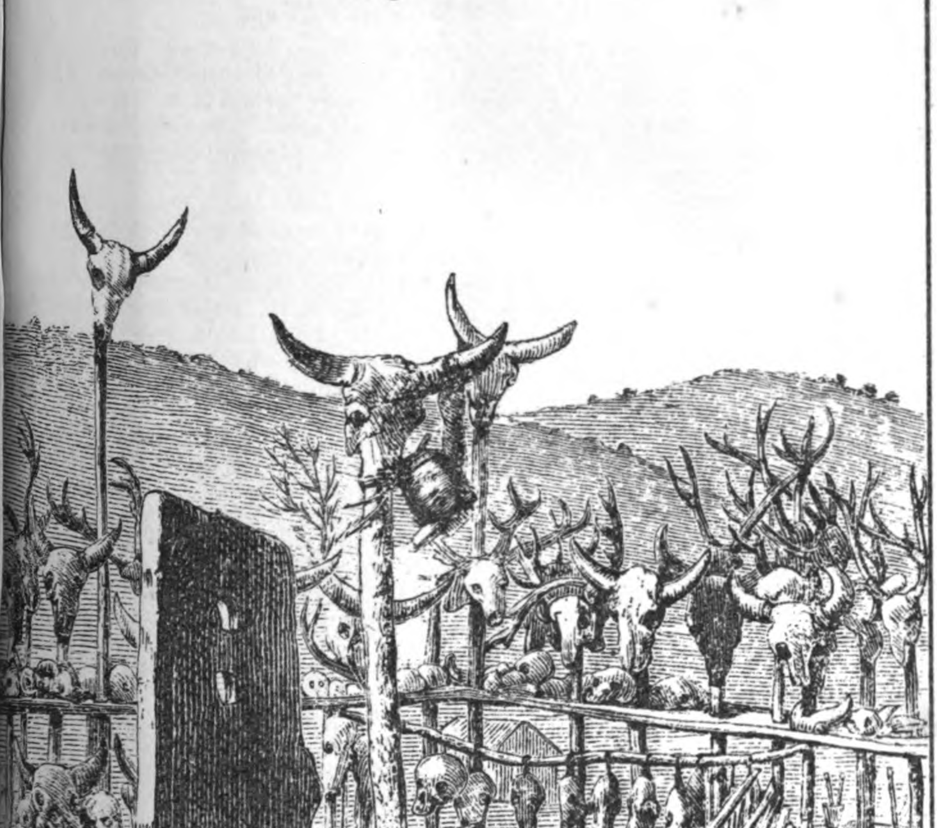
The troops at once occupied the village. Fires were found burning in the houses, domestic articles were lying about as if abandoned in haste; and a few dogs cowering in corners testified to the unpreparedness of the Lushais for this result of their attack. In some houses were picked up white shirts which had been distributed to some of the people who had visited us at Chepui.

There must have been some great defect in the Lushai tactics to account for their signal defeat. A great council of war of all the chiefs had been held the night before in Kungnung village and Poiboi had been induced to throw in his lot against us. The course of action determined on was as follows; one party was to divert the attention of the main force while the other stealing down the ravine would, when the troops were far enough advanced, attack the coolies, who they imagined would be unprotected. They thus hoped by killing a number of the coolies to demoralize the rest, so that, being deprived of our transport, we should be obliged to retire. Their failure may be due to the following causes. In the first place they were not quite sure which of two routes we might take. Secondly we marched an hour earlier than usual, and it is probable that the party the advanced guard fell in with was the one intended to watch the coolies. They had not had time to finish their ambuscading arrangements before we met and scattered them so completely that only a few were able to carry out their instructions while the advance on Kungnung was so rapid that the enemy were unable to collect in sufficient force to make an effectual resistance at the stockades. The utter discomfiture of the Lushais was evident from the fact of their leaving so many of their dead in the ravine, having only time to cut off and carry away the heads of two of these; and even next day when a party was sent down to burn the dead bodies and recover some great coats, &c., the dead were found lying as they had fallen, no attempt apparently having been made to remove them.

The lessons I then began to learn during the Lushai expedition, and which I little thought I should have to put in practice during seven winters thereafter in dealing with hill tribes, may be briefly summed up as follows. With these tribes a steady advance will almost invariably ensure success; all arrangements should therefore be made if possible so that there should be no appearance even of a check. An advance need not necessarily be rapid, though that may be necessary at times, but it should be steady. Over and over again, moreover, has a bold but unaggressive front converted enemies into friends by convincing them that, although we did not intend to be turned back from our purpose, yet at any rate we did not wish to achieve it by bloodshed if it could possibly be avoided.

On the 17th February the column reached Chumfai, or Lungvel, Lalboora's chief village. The stronghold was deserted. It was situated on a slight elevation at the head of the valley, and consisted of about 500 houses. In the centre was the tomb of Vonolel, (see Fig. 4), on an open elevated spot, a low platform of stones surrounded by an open paling, each upright carrying a head or heads, of deer, *metna*, monkeys, &c., forming a perfect forest of horns. Inside the tomb a broken Burmese idol was placed in

Fig. 4.



VONOLEL'S TOMB.

state and, in the centre, a post bearing a very large *metna* skull from one of the horns of which a human head and arm recently cut off were suspended, and just beneath we found a foot. The unfortunate, whose head and limbs these were, we afterwards learned was one of the Soktés killed in an attack on the neighbouring village of Chonchim two days before. The eyes had been torn out, the skull smashed and shot-marks and spear cuts disfigured the face. When all the troops had come up, they were formed in a hollow square, and the General addressed them, telling them that the goal had been reached and that but little more remained to be done before marching back. This little was dictating terms to Lalboora, and on the 18th the General marched to Chonchim, situated on a lofty peak three miles N. W. of Chumfai, where the widow of Vonolel resided. On approaching the village, which was strongly stockaded, it seemed as if our entrance would be opposed, for a large number of Lushais appeared shouting and yelling, but a steady advance brought them to their senses and the terms imposed were explained to them.

By the 21st February the terms had been complied with and the return march was commenced. No incident occurred, and by the 10th of March Tipai Mukh was once more a deserted spot, and not too soon for the bad weather was setting in, it was very hot and cholera again broke out among the coolies, a far more fatal and fearful enemy than the Lushais had been.

As I have said elsewhere, the Lushais, though raiding on each other, have not given us much anxiety concerning our own subjects, till last year, when they massacred Lieutenant Stewart's party. Even this was not premeditated, except so far that Howsata's party was out on a raiding expedition, and having crossed to the Laichal range, accidentally came across Stewart's camp and finding no watch kept, seized the opportunity of securing heads and retreated at once to their villages. The cause of the raid apparently was this. Howsata quarrelled with his wife the daughter of another chief Jahuta. She fled to her father. Howsata followed her and tried to recover her. Jahuta at first refused, but finally agreed to give her up if Howsata would bring him two heads of any foreigners. This sounds like a passage out of the Old Testament, when David went forth with a light heart to mutilate two hundred Philistines at the bidding of a man whom he wished to call father-in-law. Verily "there is nothing new under the sun," as David's own son remarks. Lieutenant Stewart was well within our own boundary when he was murdered: and we all know that an expedition was organized, that it started too late, but that it succeeded in reaching and burning Howsata's village, and the effect of the operations on the Howlongs seems to have been satisfactory and the Maliampuis seem to have been favourably impressed by our remaining in the country; but two outrages, one on Pakuma Rani's village close to Demagiri in December, and another still worse in the Chengri valley in January still remain to be punished, and it is hoped that this may be effected during the ensuing operations; which will also, I trust, afford opportunities for becoming thoroughly acquainted with these hills and their inhabitants, and that we shall have few blank spaces left in our maps of the country between Bengal and Burma.

Perhaps in conclusion one or two "hints to travellers" may be useful. In the first place avoid sleeping on the ground if possible: and it is very easy to do so, for with all the bamboos and forest a small bedstead of some sort can easily be rigged up: for instance, place two logs lengthways, say 2 ft. 6 in. apart, then cut several bamboos into pieces 3 feet long and split them up by beating them with a heavy piece of wood; cut them down throughout their length and open them out and lay them flat across the logs. This forms a very fairly comfortable resting place. By cutting some fine strips of bamboo and lacing the ends with cane, a sort of chick can be made, which weighs nothing, and unrolled and laid on two logs forms a bedstead also, as above. It does not, however, take long to cut four supports and, planting them firmly in in the ground, construct a bed on these. But what I have found most comfortable is a small light canvas hammock; which, however, I could never like when slung, but I constructed a framework as above with four legs, and stretched the hammock over the end pieces, pegging the ropes firmly down. The sides of the hammock I laced to the side pieces of wood. At the head and feet I planted two long forked sticks holding a ridge pole and over this was stretched my waterproof sheet. It could all be done in a quarter of an hour and afforded a comfortable abode, the ends of this *tent d'abri* being closed in with grass screens if there was a chance of rain. I went through some very wet weather quite happily in the Garo hills with this arrangement. The waterproof sheet should always be of sufficient size to cover the bed well and if in damp places like the Lushai valleys, a mosquito net of thick muslin made tent-shape to fit under the waterproof will be very useful; when close in texture it keeps out any amount of moisture. I have slept in the open in a foggy night with only these curtains and kept quite dry, the dew outside forming quite thick on the curtains and flowing in in a little stream if they were incautiously touched from inside. These curtains should have loops at the bottom through which on either side poles can be run which keep them taut.

One thing to remember is, not to allow your coolies to attach the framework of the bed to the hut they are building for you unless you are alone in the hut. This was done once in a hut I shared with a companion. I unfortunately was feverish and very restless one night, and every movement of mine sent a miniature earthquake careering through the hut, and I found myself at last being pelted with things. Fortunately we were on a very short baggage scale and the shower soon came to an end perforce for want of missiles.

OPINIONS ON THE SUPPLY OF REMOUNTS TO BRITISH AND NATIVE CAVALRY, AND ON HORSE BREEDING IN INDIA,

expressed at an Informal Meeting held at Simla on the
30th August, 1889.

BRIGADIER-GENERAL G. LUCK, C. B., Inspector General of
Cavalry, in the Chair.

The discussion was only regulated by the rule that no speaker was to occupy more than ten minutes. Every one who spoke touched on a variety of topics connected with the subject of the evening. There was also much conversation, and many opinions were informally expressed by officers who did not care to rise. An endeavour has been made to preserve these opinions, in so far as they appeared to be approved by a majority of those present, in addition to the remarks directly addressed to the meeting by the various speakers.

For the sake of clearness, and in order to collate the opinions existing on each topic, the whole subject is divided into heads as follows :—

I.—Measures for supplying indigenous remounts to—(A) Native cavalry, (B) British cavalry and artillery.

[Native cavalry put first because few country-bred remounts are at present taken for the British mounted branches, and because the question of mounting native cavalry is now in an acute stage.]

II.—Improvement of horses in India, and increase of supply for army purposes.

III.—Reserve of horses for the army.

IV.—General conclusions.

I (*A*).—MEASURES FOR SUPPLYING INDIGENOUS REMOUNTS TO NATIVE CAVALRY.

This subject may be sub-divided into :—

(*a*).—The working of the present system of supply by a committee or by purchasing agents.

(*b*).—The cheapening of remounts by buying young stock and rearing them either regimentally or in establishments supported by a combination of regiments.

(*a*).—With regard to the working of the present system by which two officers, one in the Punjab and another in the North-West Provinces purchase remounts for the whole Bengal Cavalry, **COLONEL DEANE** said, that speaking from the regimental point of view, if he were in command of a regiment of native cavalry, he would much sooner purchase regimentally than have his horses bought for him by remount committees or remount agents. This, however, was the purely regimental view of the question, and very few officers regarded it from any other standpoint. The problem which Government had been called upon to solve, was that of how to continue to supply horses for the native cavalry at normal rates. Prices had shown a steady inclination to rise of late years and the necessity had arisen for considering whether the *chanda* price for remounts should be increased, and a larger amount of compensation paid for native cavalry horses. The rise in prices was mainly due to the pernicious system of regimental compensation in the remount market. This system had failed when officers were allowed to compete in purchasing for the British mounted branches in India, and it had likewise failed in England where it had been found necessary to form a remount department, for the purchase of horses for all the mounted services. The regimental purchasing system was totally unfitted for time of war and the system to be for the future introduced, should be one which was calculated to supply the wants of the army, not only in peace time, but also when regiments proceeded to the front. Under the system recently introduced by Government, owing to which large numbers of country-bred stock would have to be purchased for the British mounted branches if remounts were purchased regimentally, regimental agents would not only have to compete with one another, but they would also have to compete with the Government remount agents, and thus the price for native cavalry horses would soon rise to a prohibitive figure. The only manner in which this condition could be avoided, was by placing purchasing operations under one agency. For this purposes an agency was formed some five years ago composed of committees of native cavalry officers, one for the Punjab and one for the North-West Provinces. The result of their purchasing operations was to check the steadily rising prices for native cavalry remounts. It was found, however, that the number of officers appointed for the purpose, together with their large following, was as unnecessary as it was expensive. The all round average rate, at which remounts were secured for the native cavalry was about Rs. 253 per horse, which was just about the same rate as that at which remounts had been obtained under the regimental system. It was accordingly decided to inaugurate a cheaper agency instead of the committees. Two remount agents, specially selected officers of the native cavalry, were appointed. The results obtained by them up to date were satisfactory, as the general average, at which horses had been secured was about Rs. 245 per head, against about Rs. 253 a head paid under the committee and regimental purchasing system. The remount department had also been able to purchase from the Calcutta remount depôt nearly 200 horses for the native cavalry at an average price of about Rs. 350 each.

The feeling of officers of the native cavalry was generally against the remount agency system, but the main reason for this was that officers of the native cavalry had not yet come to understand that the remount depôt in undertaking the onerous duty of supplying them with what was required was acting under the orders of Government in the interests of the sowar, to help the regiments concerned and not to throw difficulties in their way. In the selection of horses, it might be said that it was just as impossible to please men as in the selection of women, but judging from the reports received to date, the purchases made for the native cavalry might be regarded as satisfactory as those made for the British mounted branches, from which complaints were by no means unknown. This, notwithstanding that the British army in this country is about the best mounted force in the world.

Little more was said on this subject publicly but the feeling among the officers of native cavalry present was decidedly against the system. It appeared to be generally agreed that the quality of the remounts hitherto obtained under the present system was inferior to that procured when each regiment bought for itself, while the price was no less, and according to some, even greater, because of the larger proportion of three year olds, and because it had occasionally happened that young horses sent to native cavalry regiments had been subsequently rejected as unfit for work and sold at a low figure. It was also thought that the abolition of regimental purchase was a blow to the *silladar* system which has produced such excellent results, but which is now being indirectly attacked in various ways.

General Luck, however, thought the remounts lately sent to native cavalry regiments by Major Chalmers were equal to those previously purchased by commanding officers, and instanced one regiment which had received a batch from the Sibi district which the commanding officer considered the best he had ever had.

(*b*).—The possibility of obtaining remounts of the stamp now required in the native cavalry, at a cost within the means of regiments, by purchasing young stock and rearing them, either regimentally, or on runs maintained by several regiments in common.

This subject was touched on by several speakers:—

Colonel Deane observed that considerable stress had been laid on the advantages likely to accrue from the establishment of combined regimental rearing depôts for young horses: he considered that such depôts would be highly advantageous to the native cavalry, but he very much doubted whether regiments would go to the expense, risk and trouble of organizing them. Although Government had freely offered land for horse runs to natives and others who might be willing to rear stock thereon, very few had hitherto come forward to avail themselves of the concession.

Nevertheless the successful introduction of this plan by the army remount department in the case of British cavalry has attracted the attention of native cavalry officers. In one or two instances commandants have endeavoured to bring up a few colts and fillies in paddocks adjacent to their own lines with a fair amount of success. Others have purchased young animals and entrusted them to horse breeding *zemindars*, having some connection with the regiment, to rear for them. This plan is also promising. But it is generally felt that neither rearing regimentally nor by the help of *zemindars* can be more than an auxiliary to other methods of procuring remounts. Few regiments have within reach the land and other means of running young stock with any prospect of success. Even those most favourably situated cannot hope to turn out more than ten or a dozen remounts annually, only a fifth or sixth of the total number required by the regiment. Besides a change of station every two or three years must tell against regimental rearing. As to buying young stock and arranging with *zemindars* for their bringing up, it is true that more remounts annually can be produced in this way, but then again it is not every regiment which can secure the assistance of a land-owner sufficiently interested in the corps to do his best for its interests, and if it be a mere question of profit with the *zemindar*, his terms will probably be higher than the regiment can afford.

It is thought, therefore, that the only satisfactory solution of the problem lies in what may be called co-operative horse rearing, that is to say, in the combination of regiments to maintain runs, somewhat similar to that at Babughar, on which to bring up young stock until they are fit to be taken into the ranks. It is well known that there is still a considerable amount of waste land in the Punjab, more or less suitable for rearing horses. The idea which seems to be generally in favour is that groups of four to six regiments should combine to acquire tracts of this land from Government. It is not thought likely that Government would grant the land free, but as it is required for what is practically a public object Government might see its way to leasing it on easier terms than it would demand in the case of private individuals. The amount of land is the next question. Four regiments require annually about 250 remounts. If these were bought as yearlings, and taken into the ranks at four years old, it is evident that each run would have to be large enough to carry 750 head, or allowing for casualties and failures, say 1000 head altogether. In Australia it is customary to allow one head of stock for every ten acres of grass land. The average of Indian grass land must certainly be much poorer than the average of Australian, but the difference can be made up by growing lucerne, &c., provided the run has a proper amount of frontage on a canal.

To run a thousand head would therefore require a block of ten thousand acres, or say roughly sixteen square miles. But it would probably pay regiments to embark on a co-operative scheme of this kind if they could be certain of obtaining half their remounts, or not less than thirty per regiment from the run, leaving the remainder to be purchased in the usual manner. In this case a run maintained by four regiments would be about eight square miles. If maintained by five regiments it would be ten square miles, and if by six regiments twelve square miles.

Three or four such runs located in different parts of the Punjab would suffice for all the distinctively Punjab cavalry regiments (9th to 19th) and the cavalry of the Punjab Frontier Force, including the Guides. If successful, endeavours might be made to find runs for the Hindustani regiments (1st to 8th) with whom might be coupled the Central India Horse, if they desired to join. The existing runs might also be enlarged to allow of their maintaining an increased head of stock and turning out a greater number of remounts annually.

In alloting land for runs two points appear to be essential. First that there is a sufficient amount of canal frontage. This should not be less than from two or three miles for runs intended to carry from 500 to 750 head of stock as above suggested. Secondly, that the total area of each run should be fully ten acres per head of stock in the first instance. If the land proves capable of carrying a greater number, the run will be able to turn out more remounts, and will be by so much the more profitable to the regiments sharing in it. But to commence with too small an area must lead to failure, and as it would be the money of the men which was engaged, regiments would only commit themselves to the enterprise if they could see their way quite clearly before them.

The actual management of the runs could probably be undertaken by pensioners, the regiments taking it in turn to send an officer to inspect every few weeks. From what is already known it is probable the cost of the young stock may be kept down to five rupees per head *per mensem*, exclusive of whatever is demanded by Government for the land.

Some officers considered that not only might young stock for remounts be profitably reared, but that horses might be bred with advantage on the runs. Considering the number of good mares now in the ranks which go through their lives without producing a foal the idea is an attractive one, though beset with risks and difficulties. It is, however, possible that, if the runs were a success, young mares might be bred from once before being drafted to regiments, and might again be returned to the stud at ten or twelve years of age. This plan is now being tried in the case of Government remounts, but with regard to native cavalry it will be first necessary to get the runs, and to make them a success as rearing establishments, before thinking of breeding.

It may be added that the establishment of runs would not prevent regiments from making any private arrangements they chose, either in the way of rearing young stock for themselves, or of entrusting them to *zemindars*.

I. (*B*).—MEASURES FOR SUPPLYING INDIGENOUS REMOUNTS TO BRITISH CAVALRY AND ARTILLERY.

With regard to the supply of indigenous remounts for the British mounted branches, and the increase of supply for army purposes COLONEL DEANE considered that the interests of the army would be best served by measures for all the mounted branches, British and native, being made under one department together. He gave a sketch of the origin and development of the present system of procuring country-bred remounts, showing how the stud system had failed and why the horse breeding department had been inaugurated. Endeavours had been made during past years to secure full grown country-bred remounts for the army with little or no result. The only manner in which, therefore, a supply could be obtained was by sanctioning the purchase of young stock by rearing them in Government depôts. A commencement was made in this direction in 1881 when sanction was accorded to the purchase of 150 young stock annually, from the age of 2½ years and upwards. The results proved satisfactory, and General Luck would tell them that the country-bred remounts issued to the ranks had proved in every way admirable troop horses. In consequence of these satisfactory results, Government had gradually increased the annual purchases until during the present year nearly 1000 would be bought for the rearing depôts at Hapur, Kurnal and Ahmadnaggar, and a similar number annually. As the numbers increased, however, it was found necessary to decrease the age at which the horses were purchased, so that in future they would be bought at 6 months old and upwards. The annual out-turn of horses from the horse breeding department was, according to Mr. Hallen's figures, about 2,500; of these 1000 would be purchased for the British mounted branches, leaving about 1500 for the native cavalry, police, and general public The requirements of the native cavalry in this presidency were about 1000 remounts *per annum** and he hoped that the remount department would be able to help the native cavalry by supplying them annually with a certain number of remounts from the Government rearing depôts. This would become yearly more feasible as Government had recently sanctioned breeding being commenced in the rearing depôts, from which system he hoped to see in the course of years a large supply of remounts produced, fit for both British and native branches of the service. He considered that no reliance could be placed on *zemindars*, or others, to produce remounts for the army, and that the only way in which it could be managed satisfactorily was by the intervention of the State in the direction in which the horse breeding department had been shown to fail. That department had bred horses fit for the service without doubt, and it was now only necessary to extend its operations through the medium of government depôts.

COLONEL DEANE then described the system under which the British army was remounted from foreign sources through the remount depôts at Calcutta, Madras and Bombay, and the reserve depôts at Saharunpore, and Hosur in Madras. He commented upon the merits of the Australian remounts and referred to a recent visit to the depôts in England as having afforded him an opportunity of judging of the relative merits of English and imported Indian (Australian) remounts, and the results he considered were by no means unfavorable to the remounts in this country. Referring to the Gulf horses imported to Bombay he said that General Luck was well acquainted with their merits and he much desired to see an increased importation of this very useful class of remount for some of the British mounted branches in the western presidency, for the native cavalry of Madras and Bombay, and for the Central India Horse. He described the system of keeping horses in reserve for the purpose of acclimatization and referred to the increased and rapid means of obtaining remounts from the colonies in powerful steamers, owing to which it was now feasible to send many remounts direct from the purchasing depôts to units of the service. He hoped to see the time when many of the admirable mares received from the colonies would be covered by Government stallions in the country, by which system a large increase of remounts would be annually obtained at comparatively little expense, and with but little delay in the mares afterwards joining the ranks.

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* The total number of remounts required annually by native cavalry in the Bengal Presidency is about 1500.

P. J. M.

General Luck confirmed what had been said by Colonel Deane regarding the goodness of the young country-breds now being passed into the ranks of the British cavalry.

Lord William Beresford criticized the present system, pointing out the risks of buying and rearing young stock. There was nothing more difficult than to say how a young colt or filly of one year old, much less of six months would turn out. Even the future development of two year olds was very uncertain; moreover he understood that it was now intended to breed from young mares at the remount depôts. This was going back to the old stud system which he had himself seen, and which had rightly been condemned on account of the lavish expenditure on details, and what might be termed luxuries.

II.—Improvement of horses in India, and increase of supply for army purposes.

This subject is sub-divided as follows:—

(*a*) Horse breeding as an administrative question.

(*b*) The best class of stallion for India, and the number which should be maintained.

(*c*) The number and quality of indigenous mares; also whether mares should be imported for breeding purposes.

(*d*) Free trade in horses. Effect, if any, of purchasing for native cavalry through a committee, or through one officer in each province.

(*e*) The influence of polo and pony racing on horse breeding. Also proposal to give Queen's Plates for country-bred horses at race meetings.

II. (*a*).—With reference to the proposed transfer of the administrative control of horse breeding operations from the Military Department to that of Revenue and Agriculture Sir Edward Buck made a short speech in which he desired to impress two points on his hearers.

First.—That the civil department did not desire to take upon itself any responsibility that would give room hereafter for the charge that the failure of military operations was due to the introduction of reforms which had not the sanction of the Military Department, and that, as regards choice of imported stallions, their management, or the selection of mares, the Department of Revenue and Agriculture would carry out entirely the instructions of the Military Department.

Secondly.—That the Military Department depended even under the new system of buying younger horses, on the initial supply of colts and fillies produced by the breeders, and it appeared therefore that the influence of the civil authorities should be exerted to introduce a better system of breeding and rearing by *zemindars* and others. SIR EDWARD BUCK gave his assurance that any assistance that could be given by the civil authorities in this direction would, if they had anything to do with the administration of horse breeding, be afforded.

II. *(b).– The best class of stallion for India, and the number which should be maintained.*

MR. HALLEN made a speech in which he described the quality of horse required for army purposes. To produce such horses several classes of sires had been tried. Fond as he was himself of blood he considered the English thorough-bred unsuited to this country, chiefly on account of hereditary unsoundness, and delicacy of constitution. The Arab also he had reluctantly been obliged to give up as he thought his stock too small and light. The sire he thought best of now was the Norfolk Trotter, but he acknowledged the difficulty of getting this animal of sufficiently pure blood to stamp his own likeness on his stock. Numbers of animals were bred and sold in England as Norfolk Trotters which were mongrels, sometimes the result of a direct cross between a thorough-bred horse and a cart mare. Such were of course of no use for breeding from. His own practice was that when a Norfolk Trotter failed to get good stock, he transferred him to another district, and if his produce continued unsatisfactory he then considered it proved that he was a mongrel, and the horse was at once castrated and sold.

With regard to the number of stallions owned by Government, there were 300 on his list. The number of branded country-bred mares was about 20,000, but only about half of them were covered annually by Government stallions. The number of foals annually produced to Government stallions was eleven or twelve per horse. The total number taken into all branches of the Government service was about two thousand one hundred, giving an average of seven per stallion to Government.

MR. HALLEN afterwards said, with reference to remarks made by Colonel Lance, that he should approve of the introduction of half-bred Australians. He also strongly advocated an increase in the number of stallions.

LORD WILLIAM BERESFORD condemned the operations of the horse breeding department. He considered the small number of foals produced per stallion showed a want of management, and remarked that breeders of thorough-bred stock at home were very dissatisfied if they did not get a foal for every mare sent to an expensive horse, such as Hermit, whose list of 50 mares was always full, and he believed that at least 40 mares held. He said one reason of the small number of foals got by Government stallions in India was the excessive number of jumps allowed to individual horses, and he instanced what had come under his own observation some years ago at Jagadri.

This particular kind of mismanagement of Government stallions was afterwards spoken of by several officers, and was generally acknowledged to be very common. It is believed that the *jamadar sais* of the stallions is invariably amenable to a pecuniary gratification, and as it also happens that there is almost always one stallion which is a favourite with native breeders to the exclusion of the others, that particular horse gets a large number of mares, while the others do very little.

Lord William Beresford further contended that it was not fair to ask Government to increase the number of stallions when the results from those now in use were so poor. He also thought that the want of success of the present system, which had now been on trial for fourteen years, showed that it was not on a sound basis.

Colonel Lance thought the number of stallions in India should be increased, as even now a considerable number of mares are covered by country stallions and therefore could not be expected to produce animals fit for military purposes. [Mr. Hallen allowed that only half the mares in the country came yearly to Government stallions.] Colonel Lance advocated half-bred Australian stallions as superior for Indian mares to either thorough-breds, such as were procurable at the Government price, or to Arabs. He approved of Norfolk Trotters, which were really half-breds, and had seen some good horses got by them, but would like Mr. Cox, as a great advocate of that breed, to tell him how many "pure" as opposed to "spurious" Norfolk Trotter stallions he had seen in England. He had himself been to the Norfolk Trotter breeders, and found them crossing thorough-breds with coarse mares (not actual cart mares), and he believed the animal thus produced was the only one now procurable in any numbers and at the price paid by the Indian Government.

Mr. Cox admitted he had only seen five or six pure Norfolk Trotter stallions in England, and that a number of those in this country were "spurious." He repeated in substaace the remarks made in his lecture on thorough-breds and Arabs as stallions, disparaging both, but particularly Arabs.

Mr. Hallen said,—"It has been stated by one speaker that the horse breeding department has not been successful as it should have been; that it has been in existence 14 years, and a greater improvement in the stock and a larger number of produce ought to be resulting. In reply I have to mention that the improvement in horse stock is admitted, irrespective of that speaker's statement, and I have to point out that nature will not be hurried. She will go at her natural pace as regards the period of equine gestation and the attaining of adult life; and as the former takes 11 months, and the latter five years, or more, to accomplish, the amount of improvement that has occurred in two generations of stock, must be accepted as satisfactory. Had the horse breeding department the improvement of the breeds of dogs, rabbits, or pigeons instead of horses to carry out, the remarks of that gentleman as to our progress not having been fast enough to please him, would have been relevant."

Mr. Hallen continued,—"It has been said that the management of the stallions of the department is not satisfactory, and one speaker has described having seen at Jagadri stand, where there were two stallions, several mares brought day after day for service, and that the horse liked of the two was always brought out, and brought out too several times in the day to serve every mare brought to the stand. I wish he had kindly brought this fact to the notice of the department at the time, but I am obliged to him for having now brought it so prominently to notice, for I have a better opportunity of explaining that with the few European superintendents—myself and two others, one for the North-West Provinces and Rajputana, and the other for the Punjab—it is not an easy task to have the strict rules laid down, with regard to recurring services of stallions, duly acted up to. I have frequently implored Government to grant more European officers, but up to this time no additional strength has been granted. Picture to yourselves one superintendent having to superintend the stud operations of an area of country greater than that of France or Germany, and then our weak strength will be acknowledged.

"District civil officers do, as a rule, most kindly render us some assistance in the carrying out of our arduous labours, but instances similar to the Jagadri incident no doubt do occur when a *tahsildar*, or other civil officer nominally in charge of stallions attends to requests, made to him for aid, in a perfunctory manner. When the horse breeding department is transferred from the Military Department to the Revenue and Agricultural Department, and its operations virtually become a portion of revenue duties, then the department will receive, no doubt, real civil local help from civil officials, who will have to consider it a part of their duty to see that the stallions are duly cared for according to the rules laid down, and thus the department will be better aided.

"As regards the stallions supplied by the Right Hon'ble the Secretary of State, I have to state that I consider that India owes a debt of gratitude to the purchasing officer, General Thornhill, for the very good horses which, as a rule, we receive. It has been stated by one speaker that he holds a very different opinion on this subject; that he feels assured the thorough-bred English stallions supplied, are inferior; that the so-called Norfolk Trotters are cart horses, and quite unfit to produce army remounts. In reply, I have to point out that the horses received during the last 14 years are those that have produced the improved stock; that the thorough-breds received have been as good as can be expected, considering the great dearth now-a-days of thorough-breds possessing sufficient bone and power; and as regards the Norfolk Trotters, they all have pedigrees sent with them, and of these many are registered in the "Hackney Stud Book," and so I cannot support the gentleman in his condemning them as "cart horses." But, as we in the horse breeding department judge of a stallion's worth by the stock he gets, so we always cease using a horse if we have proof of his being by descent not as he has been represented; and he is castrated and sold. It will be gratifying to General Thornhill to hear that but few of the horses bought by him have had to be so dealt with.

"It is very easy for any one to assert that our English stallions are bad, and the purchasing officer does not know anything about horses fit for stud work; but if that gentleman, or any one of us at this table, had been as long as General Thornhill has been (14 years) purchasing horses for India, no doubt he would be accused of want of due knowledge or care, for it is a truism that with regard to women, wine and horses, there will be always a vast difference of opinion, and that this is the case, is not altogether to be deplored."

Some conversation ensued as to whether the price now allowed by Government for imported stallions was sufficient, and whether the horses sent out were selected with judgment. The general opinion appeared to be that the Government price, £350, was not sufficient to procure thoroughbreds of the rather rare stamp required, *viz* :—sound, short legged, short backed horses, with above the average amount of bone, such as would be selected for breeding weight-carrying hunters. That Norfolk Trotter sires of pure blood were practically not to be had at all, and that it was very desirable the quality of the stallions imported should be improved as much as possible by most careful selection and also by raising the price now paid.

The general opinion also appeared to be that the number of Government sires should be increased. For although, as pointed out by Lord William Beresford, the number of foals which can be credited *per annum* to each stallion is unduly small, yet it is equally certain that a large number of mares fit to breed from are unable for various reasons to obtain the services of a proper horse. Districts are large, many mares come in season at about the same time and so forth. It is therefore pretty generally agreed that stallions of the sort favoured by native breeders should be multiplied. It has also been suggested by Colonel Lance that increased efforts should be made to diminish the number of entire country-breds and by way of lessening the mischief caused by these worthless sires the French system of approving and authorizing as stallions a certain number of the best local horses might be introduced.

II. (*c*).—*The number and quality of indigenous mares.*

Mr. Hallen thought the 20,000 fairly suitable mares now in existence were sufficient for practical purposes.

Mr. Cox thought something should be done in the way of importing mares, pointing out that to produce a good breed of horses as much attention should be paid to the dams as to the sires.

His proposition was that in importing Australian remounts Government should try to secure as many mares as possible. That a large number of mares (about a thousand) should be retained at the remount depôt until they had each produced one, if not two, foals, before being passed into the ranks. That the mares which produced the best foals should be again utilized for breeding after they had been a certain number of years (five or six?) in the ranks. This plan he considered might yearly produce five or six hundred remounts, suitable for British cavalry and artillery, at a cheap rate.

General Luck said that Mr. Hallen had already been authorized to breed from country mares which had been selected as remounts for British cavalry and artillery. He hoped Government would shortly sanction Australian mares being also bred from. It was impossible to breed from old mares, unless they had produced a foal or two in their youth, but when this was the case mares of a certain age would frequently be useful for breeding purposes.

Although no public reference was made to the subject, some conversation took place among native cavalry officers as to the effect produced on the general breeding stock of the country by the enlistment of so many mares in native cavalry regiments. It was agreed that, generally speaking, the mares bought as remounts were the best of their kind, and that in many cases the brood mares of the country were either inferior, or else old and worn out.

At the same time it was recognized that direct interference with the law of supply and demand was inadvisable, and that the remedy probably lay in some such system of breeding from remount mares as has been proposed and partially sanctioned for British cavalry and artillery. [This subject is referred to at greater length under I. A (b).]

It was also considered that branding mares was a measure of doubtful utility and that short of regular breeding establishments the only method was to have a large number of stallions under proper supervision and to cover all mares that might be brought up.

II. (*d*).—*Free trade in horses. Effect, if any, of purchasing for native cavalry through a committee or through one officer in each province.*

With reference to a proposition made by Mr. Cox in his recent lecture at the United Service Institution, **Mr. Robertson**, in an able speech, pointed out that any attempt on the part of Government to keep a lien on the produce of their stallions would defeat its own ends. Breeders kept mares and bred from them for profit, and if they were prevented from disposing of their produce to the best advantage they would certainly cease to breed. Mr. Robertson also said that the effect of purchasing native cavalry remounts by a committee for the whole native cavalry had undoubtedly had a bad effect on horse breeding in the Rawal Pindi district, at all events when first started. The native breeders looked upon it, as in fact it was, an attempt on the part of Government to lessen the prices paid for the class of horses chiefly produced in that district. It had undoubtedly discouraged breeders, and some of them had parted with their mares, while others were turning their attention to breeding ponies or mules.

Lord William Beresford, replying to Mr. Robertson, said that although Government, for the benefit of native cavalry regiments, had endeavoured to lower the price of their horses, yet that they were willing to give six hundred rupees, more than double the price of native cavalry remounts, for four year old horses suitable for British cavalry, so that he did not consider the action of Government on the whole was discouraging to the native breeder, but rather the reverse. He also observed that the advantages which the *zemindar* would obtain by breeding a superior class of remounts had not been sufficiently pointed out to those most concerned, while a great deal had been made of the discouragement produced by the measures taken to give native cavalry their remounts at a cheaper rate than formerly.

Colonel Deane said that, certain remarks had been made, about the desire to keep down prices having a most injurious effect, and that *zemindars* could only be induced to breed a class of animal fit for remounts by the promise of high prices. Colonel Deane observed that high prices had been offered for the past ten years for country-bred remounts for the British mounted branches, but that they were not forthcoming. He was now quite prepared to purchase 500 horses of this class at Rs. 500 each if they could be produced. In addition, the prices offered for young stock for the Government rearing depôts were very remunerative, and he considered that, so long as such prices were offered to breeders, the encouragement given by Government was ample, and that remounts should be forthcoming for native cavalry at an average price say of Rs. 250 for the sowar and Rs. 350 for the native officer. If, however, native cavalry regiments were placed in competition one with another, and with the Government remount agents, good remounts would never be obtainable at those figures, and he therefore hoped that as Government would not sanction an increase in the *chandar* price, the remount agency system might be allowed to continue in the interests of the native cavalry, the improved remounting of which it was his earnest desire to promote.

Mr. Hallen expressed his opinion as follows:—"Native cavalry remount committees and remount agents do not support and foster horse breeding; they only buy for native cavalry at prices averaging Rs. 248 or Rs. 250. For Government to force breeders to sell *cheap*, is a ruinous policy. To "*cheapen*" horses in a market that requires fostering and encouraging, is a great mistake. Government said, 14 years ago, they wanted improved horses, and would give improved prices. In other words, to use a simile, the ordinary flimsy blanket found in the *bazar* and worth Rs. 2 was not good enough, and what was required was a stronger, heavier blanket, calculated to last a longer time.

"It is acknowledged that the improved horses are now found in the country, and as a consequence, they are found to be more valuable, and the breeders ask prices higher for the better animals, and native cavalry regiments find it necessary to give higher prices. The Government then introduced a system of having a native cavalry purchasing committee, to prevent the competition resulting from regiments purchasing independently, so as to keep down the price of remounts; and lately only two officers, one for the North-West Provinces and one for the Punjab districts, have been entrusted with the purchasing, and, as has been described by a gentlemen present, the average has been no more than Rs. 248 or Rs. 250."

Mr. Hallen went on to say:—"I have seen scores of horses thus purchased for native cavalry, quite fit for Madras cavalry and British cavalry, and have been appealed to by breeders to support them by inducing Government to give better prices for the better animals. I earnestly requested that a British cavalry officer might be appointed to the remount committee in order that the better animals might be bought at enhanced prices, and thus the breeders might be duly supported aud encouraged; but no British cavalry officer was appointed, and I was told, on enquiry, that it was an omission his not having been appointed. As the Government is the largest purchaser in the market, so does the suicidal policy I have indicated discourage horse breeders, and as you have been told by the Director of Land Records, Punjab, (Mr. Robertson), owners of good large mares fit for producing remounts for any branch of the service, have commenced to sell these mares, and are purchasing pony mares to breed ponies and mules. These are facts worthy of the consideration of Government, and I have brought them to notice."

The general opinion of the officers present was that, while acknowledging the force of Lord William Beresford's observations and those made by Colonel Deane they did not represent the whole aspect of the question. It would certainly appear that if Government annually bought 1000 young stock for their rearing depôts, (the total produce of Government stallions being only 2500), it ought to act as an incentive to horse breeding, but it is equally evident that these increased purchases for British mounted branches, tend to accentuate the principal remount difficulty of the day, which is to procure serviceable horses for native cavalry at a reasonable price, by diminishing the number of horses which come into the market as four year olds. If the number of young country-breds annually purchased by Government for the rearing depôts remains at the figure mentioned by Colonel Deane it will no doubt encourage breeders to persevere, but at present it would seem to have little effect as compared to the check given by the introduction of purchasing for native cavalry by committees, or by single agents. And this check is none the less real because it operates rather on the minds of dealers and breeders than on market prices.

The majority of native cavalry remounts are bought from dealers, and the dealers, whether reasonably or not, are undoubtedly dissatisfied with the new system. If the dealers do not see their way to profits they will not purchase freely from breeders, and the latter are finding themselves shut off from a known and fairly profitable market, with only an uncertainty to compensate them. And if it be the case that breeders in certain districts are turning their attention to producing ponies and mules rather than horses, it is a serious matter.

Another point brought forward was that under the present system the prices paid for native cavalry remounts have been more equalized. That is to say a less price is given for superior remounts, such as are allotted to native officers, while sowars' horses cost somewhat more than formerly. It is thought that this is not likely to induce the breeder to try and produce a good stamp of horse, and may be considered to counterbalance the effect of an occasional purchase of young stock by Government.

II. (*e*).—*The influence of polo and pony racing upon horse breeding.*

General Luck drew attention to the bad effect of polo, and also of pony racing on the breed of horses in India. It was a fact that an ordinary pony of 13·2 or 13·3 was worth more in the market than a native cavalry remount. Officers had entirely ceased to buy country-bred horses, but bought ponies largely, and Rs. 400 was a common price for a polo pony, whereas the average price of a horse fit for native cavalry was only Rs. 250. Racing ponies of course fetched larger sums, and altogether there was such a demand for ponies that it was no wonder breeders turned their attention to producing them rather than horses.

Lord William Beresford did not agree with General Luck. He thought the production of a pony was rather accidental then intended. It was a very difficult thing to breed a pony, and those produced in this country were in fact undersized horses, breeders failures rather than their successes. As to racing ponies, he had done a great deal of racing, especially pony racing, and claimed to speak with some authority on that subject. The best racing ponies were undoubtedly Arabs, after them came English and Australians. Country-bred ponies were comparatively seldom successful. He himself had only owned one good one, and he did not think it would pay any one to try and breed country-bred ponies for racing purposes.

Mr. Robertson said, that horses not being used by the natives of this country for agricultural purposes, *zemindars* can only be induced to breed a class of animal fit for remounts, by the inducement of high prices.

That for their own purposes, the pony suited the *zemindar* better than the horse, and thus, if he did not get what he considered a good price for a horse, he would always prefer to breed, as was most natural to him, a pony, which would be the usual result of mating a small mare with a small stallion.

For a pony, the breeder had a very wide market, he might be sold either as a racing or a polo pony, or as a transport animal, or as a hack, or failing these, a pony was much more suited to the *zemindar's* own wants as a pack animal, or to ride.

Similarly, he preferred breeding mules to horses, because they are like ponies, cheaper to feed and keep, are more hardy and command a more certain market.

This being so, it is eminently necessary to "nurse" the horse breeding industry, and any sudden change, such as that from purchasing by regiments to purchasing by a committee, in which breeders and dealers simply saw, as was the fact, a desire to keep down prices, would at once have a most injurious effect. And the change in question undoubtedly did, at the time, cause *zemindar* breeders, in some instances, to abandon the pursuit, and in many instances, to turn their attention to the production of ponies and mules, for which they had a sure market, and for which a great portion of their brood mares, being small, were best fitted. That this was actually the case in the Rawal Pindi district, can be confidently stated, from personal experience. Whether the subsequent operations of the remount committees, or agents, have removed the impression first created, must be left to others to decide.

The horse breeding establishment had great difficulties to contend with. Natives in this country are most difficult to move or to convince, and are very suspicious. Any attempt on the part of Government to retain a lien on the young stock produced by their stallions would defeat its own object, and at once prevent breeders from bringing their mares to be covered. Even the branding of mares was a most difficult operation, and in many districts, it required great tact and knowledge of them in Government depôts. A commencement was made in this direction in 1881 when sanction was accorded to the purchase of 150 young stock annually, from the age of 2½ years and upwards. The results proved satisfactory, and General Luck would tell them that the country-bred remounts issued to the ranks had proved in every way admirable troop horses. In consequence of these satisfactory results, Government had gradually increased the annual purchases until during the present year nearly 1000 would be bought for the rearing depôts at Hapur, Kurnal and Ahmadnaggar, and a similar number annually. As the numbers increased, however, it was found necessary to decrease the age at which the horses were purchased, so that in future they would be bought at 6 months old and upwards. The annual out-turn of horses from the horse breeding department was, according to Mr. Hallen's figures, about 2,500; of these 1000 would be purchased for the British mounted branches, leaving about 1500 for the native cavalry, police, and general public The requirements of the native cavalry in this presidency were about 1000 remounts *per annum** and he hoped that the remount department would be able to help the native cavalry by supplying them annually with a certain number of remounts from the Government rearing depôts. This would become yearly more feasible as Government had recently sanctioned breeding being commenced in the rearing depôts, from which system he hoped to see in the course of years a large supply of remounts produced, fit for both British and native branches of the service. He considered that no reliance could be placed on *zemindars*, or others, to produce remounts for the army, and that the only way in which it could be managed satisfactorily was by the intervention of the State in the direction in which the horse breeding department had been shown to fail. That department had bred horses fit for the service without doubt, and it was now only necessary to extend its operations through the medium of government depôts.

Colonel Deane then described the system under which the British army was remounted from foreign sources through the remount depôts at Calcutta, Madras and Bombay, and the reserve depôts at Saharunpore, and Hosur in Madras. He commented upon the merits of the Australian remounts and referred to a recent visit to the depôts in England as having afforded him an opportunity of judging of the relative merits of English and imported Indian (Australian) remounts, and the results he considered were by no means unfavorable to the remounts in this country. Referring to the Gulf horses imported to Bombay he said that General Luck was well acquainted with their merits and he much desired to see an increased importation of this very useful class of remount for some of the British mounted branches in the western presidency, for the native cavalry of Madras and Bombay, and for the Central India Horse. He described the system of keeping horses in reserve for the purpose of acclimatization and referred to the increased and rapid means of obtaining remounts from the colonies in powerful steamers, owing to which it was now feasible to send many remounts direct from the purchasing depôts to units of the service. He hoped to see the time when many of the admirable mares received from the colonies would be covered by Government stallions in the country, by which system a large increase of remounts would be annually obtained at comparatively little expense, and with but little delay in the mares afterwards joining the ranks.

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* The total number of remounts required annually by native cavalry in the Bengal Presidency is about 1500.

P. J. M.

GENERAL LUCK confirmed what had been said by Colonel Deane regarding the goodness of the young country-breds now being passed into the ranks of the British cavalry.

LORD WILLIAM BERESFORD criticized the present system, pointing out the risks of buying and rearing young stock. There was nothing more difficult than to say how a young colt or filly of one year old, much less of six months would turn out. Even the future development of two year olds was very uncertain; moreover he understood that it was now intended to breed from young mares at the remount depôts. This was going back to the old stud system which he had himself seen, and which had rightly been condemned on account of the lavish expenditure on details, and what might be termed luxuries.

II.—IMPROVEMENT OF HORSES IN INDIA, AND INCREASE OF SUPPLY FOR ARMY PURPOSES.

This subject is sub-divided as follows:—

(*a*) Horse breeding as an administrative question.

(*b*) The best class of stallion for India, and the number which should be maintained.

(*c*) The number and quality of indigenous mares; also whether mares should be imported for breeding purposes.

(*d*) Free trade in horses. Effect, if any, of purchasing for native cavalry through a committee, or through one officer in each province.

(*e*) The influence of polo and pony racing on horse breeding. Also proposal to give Queen's Plates for country-bred horses at race meetings.

II. (*a*).—With reference to the proposed transfer of the administrative control of horse breeding operations from the Military Department to that of Revenue and Agriculture SIR EDWARD BUCK made a short speech in which he desired to impress two points on his hearers.

First.—That the civil department did not desire to take upon itself any responsibility that would give room hereafter for the charge that the failure of military operations was due to the introduction of reforms which had not the sanction of the Military Department, and that, as regards choice of imported stallions, their management, or the selection of mares, the Department of Revenue and Agriculture would carry out entirely the instructions of the Military Department.

Secondly.—That the Military Department depended even under the new system of buying younger horses, on the initial supply of colts and fillies produced by the breeders, and it appeared therefore that the influence of the civil authorities should be exerted to introduce a better system of breeding and rearing by *zemindars* and others. Sir Edward Buck gave his assurance that any assistance that could be given by the civil authorities in this direction would, if they had anything to do with the administration of horse breeding, be afforded.

II. *(b).- The best class of stallion for India, and the number which should be maintained.*

Mr. Hallen made a speech in which he described the quality of horse required for army purposes. To produce such horses several classes of sires had been tried. Fond as he was himself of blood he considered the English thorough-bred unsuited to this country, chiefly on account of hereditary unsoundness, and delicacy of constitution. The Arab also he had reluctantly been obliged to give up as he thought his stock too small and light. The sire he thought best of now was the Norfolk Trotter, but he acknowledged the difficulty of getting this animal of sufficiently pure blood to stamp his own likeness on his stock. Numbers of animals were bred and sold in England as Norfolk Trotters which were mongrels, sometimes the result of a direct cross between a thorough-bred horse and a cart mare. Such were of course of no use for breeding from. His own practice was that when a Norfolk Trotter failed to get good stock, he transferred him to another district, and if his produce continued unsatisfactory he then considered it proved that he was a mongrel, and the horse was at once castrated and sold.

With regard to the number of stallions owned by Government, there were 300 on his list. The number of branded country-bred mares was about 20,000, but only about half of them were covered annually by Government stallions. The number of foals annually produced to Government stallions was eleven or twelve per horse. The total number taken into all branches of the Government service was about two thousand one hundred, giving an average of seven per stallion to Government.

Mr. Hallen afterwards said, with reference to remarks made by Colonel Lance, that he should approve of the introduction of half-bred Australians. He also strongly advocated an increase in the number of stallions.

Lord William Beresford condemned the operations of the horse breeding department. He considered the small number of foals produced per stallion showed a want of management, and remarked that breeders of thorough-bred stock at home were very dissatisfied if they did not get a foal for every mare sent to an expensive horse, such as Hermit, whose list of 50 mares was always full, and he believed that at least 40 mares held. He said one reason of the small number of foals got by Government stallions in India was the excessive number of jumps allowed to individual horses, and he instanced what had come under his own observation some years ago at Jagadri.

This particular kind of mismanagement of Government stallions was afterwards spoken of by several officers, and was generally acknowledged to be very common. It is believed that the *jamadar sais* of the stallions is invariably amenable to a pecuniary gratification, and as it also happens that there is almost always one stallion which is a favourite with native breeders to the exclusion of the others, that particular horse gets a large number of mares, while the others do very little.

Lord William Beresford further contended that it was not fair to ask Government to increase the number of stallions when the results from those now in use were so poor. He also thought that the want of success of the present system, which had now been on trial for fourteen years, showed that it was not on a sound basis.

Colonel Lance thought the number of stallions in India should be increased, as even now a considerable number of mares are covered by country stallions and therefore could not be expected to produce animals fit for military purposes. [Mr. Hallen allowed that only half the mares in the country came yearly to Government stallions.] Colonel Lance advocated half-bred Australian stallions as superior for Indian mares to either thorough-breds, such as were procurable at the Government price, or to Arabs. He approved of Norfolk Trotters, which were really half-breds, and had seen some good horses got by them, but would like Mr. Cox, as a great advocate of that breed, to tell him how many "pure" as opposed to "spurious" Norfolk Trotter stallions he had seen in England. He had himself been to the Norfolk Trotter breeders, and found them crossing thorough-breds with coarse mares (not actual cart mares), and he believed the animal thus produced was the only one now procurable in any numbers and at the price paid by the Indian Government.

Mr. Cox admitted he had only seen five or six pure Norfolk Trotter stallions in England, and that a number of those in this country were "spurious." He repeated in substance the remarks made in his lecture on thorough-breds and Arabs as stallions, disparaging both, but particularly Arabs.

Mr. Hallen said,—"It has been stated by one speaker that the horse breeding department has not been successful as it should have been; that it has been in existence 14 years, and a greater improvement in the stock and a larger number of produce ought to be resulting. In reply I have to mention that the improvement in horse stock is admitted, irrespective of that speaker's statement, and I have to point out that nature will not be hurried. She will go at her natural pace as regards the period of equine gestation and the attaining of adult life; and as the former takes 11 months, and the latter five years, or more, to accomplish, the amount of improvement that has occurred in two generations of stock, must be accepted as satisfactory. Had the horse breeding department the improvement of the breeds of dogs, rabbits, or pigeons instead of horses to carry out, the remarks of that gentleman as to our progress not having been fast enough to please him, would have been relevant."

Mr. Hallen continued,—"It has been said that the management of the stallions of the department is not satisfactory, and one speaker has described having seen at Jagadri stand, where there were two stallions, several mares brought day after day for service, and that the horse liked of the two was always brought out, and brought out too several times in the day to serve every mare brought to the stand. I wish he had kindly brought this fact to the notice of the department at the time, but I am obliged to him for having now brought it so prominently to notice, for I have a better opportunity of explaining that with the few European superintendents—myself and two others, one for the North-West Provinces and Rajputana, and the other for the Punjab—it is not an easy task to have the strict rules laid down, with regard to recurring services of stallions, duly acted up to. I have frequently implored Government to grant more European officers, but up to this time no additional strength has been granted. Picture to yourselves one superintendent having to superintend the stud operations of an area of country greater than that of France or Germany, and then our weak strength will be acknowledged.

"District civil officers do, as a rule, most kindly render us some assistance in the carrying out of our arduous labours, but instances similar to the Jagadri incident no doubt do occur when a *tahsildar*, or other civil officer nominally in charge of stallions attends to requests, made to him for aid, in a perfunctory manner. When the horse breeding department is transferred from the Military Department to the Revenue and Agricultural Department, and its operations virtually become a portion of revenue duties, then the department will receive, no doubt, real civil local help from civil officials, who will have to consider it a part of their duty to see that the stallions are duly cared for according to the rules laid down, and thus the department will be better aided.

"As regards the stallions supplied by the Right Hon'ble the Secretary of State, I have to state that I consider that India owes a debt of gratitude to the purchasing officer, General Thornhill, for the very good horses which, as a rule, we receive. It has been stated by one speaker that he holds a very different opinion on this subject; that he feels assured the thorough-bred English stallions supplied, are inferior; that the so-called Norfolk Trotters are cart horses, and quite unfit to produce army remounts. In reply, I have to point out that the horses received during the last 14 years are those that have produced the improved stock; that the thorough-breds received have been as good as can be expected, considering the great dearth now-a-days of thorough-breds possessing sufficient bone and power; and as regards the Norfolk Trotters, they all have pedigrees sent with them, and of these many are registered in the "Hackney Stud Book," and so I cannot support the gentleman in his condemning them as "cart horses." But, as we in the horse breeding department judge of a stallion's worth by the stock he gets, so we always cease using a horse if we have proof of his being by descent not as he has been represented; and he is castrated and sold. It will be gratifying to General Thornhill to hear that but few of the horses bought by him have had to be so dealt with.

"It is very easy for any one to assert that our English stallions are bad, and the purchasing officer does not know anything about horses fit for stud work; but if that gentleman, or any one of us at this table, had been as long as General Thornhill has been (14 years) purchasing horses for India, no doubt he would be accused of want of due knowledge or care, for it is a truism that with regard to women, wine and horses, there will be always a vast difference of opinion, and that this is the case, is not altogether to be deplored."

Some conversation ensued as to whether the price now allowed by Government for imported stallions was sufficient, and whether the horses sent out were selected with judgment. The general opinion appeared to be that the Government price, £350, was not sufficient to procure thoroughbreds of the rather rare stamp required, *viz* :—sound, short legged, short backed horses, with above the average amount of bone, such as would be selected for breeding weight-carrying hunters. That Norfolk Trotter sires of pure blood were practically not to be had at all, and that it was very desirable the quality of the stallions imported should be improved as much as possible by most careful selection and also by raising the price now paid.

The general opinion also appeared to be that the number of Government sires should be increased. For although, as pointed out by Lord William Beresford, the number of foals which can be credited *per annum* to each stallion is unduly small, yet it is equally certain that a large number of mares fit to breed from are unable for various reasons to obtain the services of a proper horse. Districts are large, many mares come in season at about the same time and so forth. It is therefore pretty generally agreed that stallions of the sort favoured by native breeders should be multiplied. It has also been suggested by Colonel Lance that increased efforts should be made to diminish the number of entire country-breds and by way of lessening the mischief caused by these worthless sires the French system of approving and authorizing as stallions a certain number of the best local horses might be introduced.

II. (*c*).—*The number and quality of indigenous mares.*

Mr. Hallen thought the 20,000 fairly suitable mares now in existence were sufficient for practical purposes.

Mr. Cox thought something should be done in the way of importing mares, pointing out that to produce a good breed of horses as much attention should be paid to the dams as to the sires.

His proposition was that in importing Australian remounts Government should try to secure as many mares as possible. That a large number of mares (about a thousand) should be retained at the remount depôt until they had each produced one, if not two, foals, before being passed into the ranks. That the mares which produced the best foals should be again utilized for breeding after they had been a certain number of years (five or six?) in the ranks. This plan he considered might yearly produce five or six hundred remounts, suitable for British cavalry and artillery, at a cheap rate.

General Luck said that Mr. Hallen had already been authorized to breed from country mares which had been selected as remounts for British cavalry and artillery. He hoped Government would shortly sanction Australian mares being also bred from. It was impossible to breed from old mares, unless they had produced a foal or two in their youth, but when this was the case mares of a certain age would frequently be useful for breeding purposes.

Although no public reference was made to the subject, some conversation took place among native cavalry officers as to the effect produced on the general breeding stock of the country by the enlistment of so many mares in native cavalry regiments. It was agreed that, generally speaking, the mares bought as remounts were the best of their kind, and that in many cases the brood mares of the country were either inferior, or else old and worn out.

At the same time it was recognized that direct interference with the law of supply and demand was inadvisable, and that the remedy probably lay in some such system of breeding from remount mares as has been proposed and partially sanctioned for British cavalry and artillery. [This subject is referred to at greater length under I. A (b).]

It was also considered that branding mares was a measure of doubtful utility and that short of regular breeding establishments the only method was to have a large number of stallions under proper supervision and to cover all mares that might be brought up.

II. (*d*).—*Free trade in horses. Effect, if any, of purchasing for native cavalry through a committee or through one officer in each province.*

With reference to a proposition made by Mr. Cox in his recent lecture at the United Service Institution, **Mr. Robertson**, in an able speech, pointed out that any attempt on the part of Government to keep a lien on the produce of their stallions would defeat its own ends. Breeders kept mares and bred from them for profit, and if they were prevented from disposing of their produce to the best advantage they would certainly cease to breed. Mr. Robertson also said that the effect of purchasing native cavalry remounts by a committee for the whole native cavalry had undoubtedly had a bad effect on horse breeding in the Rawal Pindi district, at all events when first started. The native breeders looked upon it, as in fact it was, an attempt on the part of Government to lessen the prices paid for the class of horses chiefly produced in that district. It had undoubtedly discouraged breeders, and some of them had parted with their mares, while others were turning their attention to breeding ponies or mules.

Lord William Beresford, replying to Mr. Robertson, said that although Government, for the benefit of native cavalry regiments, had endeavoured to lower the price of their horses, yet that they were willing to give six hundred rupees, more than double the price of native cavalry remounts, for four year old horses suitable for British cavalry, so that he did not consider the action of Government on the whole was discouraging to the native breeder, but rather the reverse. He also observed that the advantages which the *zemindar* would obtain by breeding a superior class of remounts had not been sufficiently pointed out to those most concerned, while a great deal had been made of the discouragement produced by the measures taken to give native cavalry their remounts at a cheaper rate than formerly.

Colonel Deane said that, certain remarks had been made, about the desire to keep down prices having a most injurious effect, and that *zemindars* could only be induced to breed a class of animal fit for remounts by the promise of high prices. Colonel Deane observed that high prices had been offered for the past ten years for country-bred remounts for the British mounted branches, but that they were not forthcoming. He was now quite prepared to purchase 500 horses of this class at Rs. 500 each if they could be produced. In addition, the prices offered for young stock for the Government rearing depôts were very remunerative, and he considered that, so long as such prices were offered to breeders, the encouragement given by Government was ample, and that remounts should be forthcoming for native cavalry at an average price say of Rs. 250 for the sowar and Rs. 350 for the native officer. If, however, native cavalry regiments were placed in competition one with another, and with the Government remount agents, good remounts would never be obtainable at those figures, and he therefore hoped that as Government would not sanction an increase in the *chandar* price, the remount agency system might be allowed to continue in the interests of the native cavalry, the improved remounting of which it was his earnest desire to promote.

Mr. Hallen expressed his opinion as follows :—"Native cavalry remount committees and remount agents do not support and foster horse breeding; they only buy for native cavalry at prices averaging Rs. 248 or Rs. 250. For Government to force breeders to sell *cheap*, is a ruinous policy. To "*cheapen*" horses in a market that requires fostering and encouraging, is a great mistake. Government said, 14 years ago, they wanted improved horses, and would give improved prices. In other words, to use a simile, the ordinary flimsy blanket found in the *bazar* and worth Rs. 2 was not good enough, and what was required was a stronger, heavier blanket, calculated to last a longer time.

"It is acknowledged that the improved horses are now found in the country, and as a consequence, they are found to be more valuable, and the breeders ask prices higher for the better animals, and native cavalry regiments find it necessary to give higher prices. The Government then introduced a system of having a native cavalry purchasing committee, to prevent the competition resulting from regiments purchasing independently, so as to keep down the price of remounts; and lately only two officers, one for the North-West Provinces and one for the Punjab districts, have been entrusted with the purchasing, and, as has been described by a gentlemen present, the average has been no more than Rs. 248 or Rs. 250."

Mr. Hallen went on to say :—"I have seen scores of horses thus purchased for native cavalry, quite fit for Madras cavalry and British cavalry, and have been appealed to by breeders to support them by inducing Government to give better prices for the better animals. I earnestly requested that a British cavalry officer might be appointed to the remount committee in order that the better animals might be bought at enhanced prices, and thus the breeders might be duly supported and encouraged; but no British cavalry officer was appointed, and I was told, on enquiry, that it was an omission his not having been appointed. As the Government is the largest purchaser in the market, so does the suicidal policy I have indicated discourage horse breeders, and as you have been told by the Director of Land Records, Punjab, (Mr. Robertson), owners of good large mares fit for producing remounts for any branch of the service, have commenced to sell these mares, and are purchasing pony mares to breed ponies and mules. These are facts worthy of the consideration of Government, and I have brought them to notice."

The general opinion of the officers present was that, while acknowledging the force of Lord William Beresford's observations and those made by Colonel Deane they did not represent the whole aspect of the question. It would certainly appear that if Government annually bought 1000 young stock for their rearing depôts, (the total produce of Government stallions being only 2500), it ought to act as an incentive to horse breeding, but it is equally evident that these increased purchases for British mounted branches, tend to accentuate the principal remount difficulty of the day, which is to procure serviceable horses for native cavalry at a reasonable price, by diminishing the number of horses which come into the market as four year olds. If the number of young country-breds annually purchased by Government for the rearing depôts remains at the figure mentioned by Colonel Deane it will no doubt encourage breeders to persevere, but at present it would seem to have little effect as compared to the check given by the introduction of purchasing for native cavalry by committees, or by single agents. And this check is none the less real because it operates rather on the minds of dealers and breeders than on market prices.

The majority of native cavalry remounts are bought from dealers, and the dealers, whether reasonably or not, are undoubtedly dissatisfied with the new system. If the dealers do not see their way to profits they will not purchase freely from breeders, and the latter are finding themselves shut off from a known and fairly profitable market, with only an uncertainty to compensate them. And if it be the case that breeders in certain districts are turning their attention to producing ponies and mules rather than horses, it is a serious matter.

Another point brought forward was that under the present system the prices paid for native cavalry remounts have been more equalized. That is to say a less price is given for superior remounts, such as are allotted to native officers, while sowars' horses cost somewhat more than formerly. It is thought that this is not likely to induce the breeder to try and produce a good stamp of horse, and may be considered to counterbalance the effect of an occasional purchase of young stock by Government.

II. (*e*).—*The influence of polo and pony racing upon horse breeding.*

General Luck drew attention to the bad effect of polo, and also of pony racing on the breed of horses in India. It was a fact that an ordinary pony of 13·2 or 13·3 was worth more in the market than a native cavalry remount. Officers had entirely ceased to buy country-bred horses, but bought ponies largely, and Rs. 400 was a common price for a polo pony, whereas the average price of a horse fit for native cavalry was only Rs. 250. Racing ponies of course fetched larger sums, and altogether there was such a demand for ponies that it was no wonder breeders turned their attention to producing them rather than horses.

Lord William Beresford did not agree with General Luck. He thought the production of a pony was rather accidental then intended. It was a very difficult thing to breed a pony, and those produced in this country were in fact undersized horses, breeders failures rather than their successes. As to racing ponies, he had done a great deal of racing, especially pony racing, and claimed to speak with some authority on that subject. The best racing ponies were undoubtedly Arabs, after them came English and Australians. Country-bred ponies were comparatively seldom successful. He himself had only owned one good one, and he did not think it would pay any one to try and breed country-bred ponies for racing purposes.

Mr. Robertson said, that horses not being used by the natives of this country for agricultural purposes, *zemindars* can only be induced to breed a class of animal fit for remounts, by the inducement of high prices.

That for their own purposes, the pony suited the *zemindar* better than the horse, and thus, if he did not get what he considered a good price for a horse, he would always prefer to breed, as was most natural to him, a pony, which would be the usual result of mating a small mare with a small stallion.

For a pony, the breeder had a very wide market, he might be sold either as a racing or a polo pony, or as a transport animal, or as a hack, or failing these, a pony was much more suited to the *zemindar's* own wants as a pack animal, or to ride.

Similarly, he preferred breeding mules to horses, because they are like ponies, cheaper to feed and keep, are more hardy and command a more certain market.

This being so, it is eminently necessary to "nurse" the horse breeding industry, and any sudden change, such as that from purchasing by regiments to purchasing by a committee, in which breeders and dealers simply saw, as was the fact, a desire to keep down prices, would at once have a most injurious effect. And the change in question undoubtedly did, at the time, cause *zemindar* breeders, in some instances, to abandon the pursuit, and in many instances, to turn their attention to the production of ponies and mules, for which they had a sure market, and for which a great portion of their brood mares, being small, were best fitted. That this was actually the case in the Rawal Pindi district, can be confidently stated, from personal experience. Whether the subsequent operations of the remount committees, or agents, have removed the impression first created, must be left to others to decide.

The horse breeding establishment had great difficulties to contend with. Natives in this country are most difficult to move or to convince, and are very suspicious. Any attempt on the part of Government to retain a lien on the young stock produced by their stallions would defeat its own object, and at once prevent breeders from bringing their mares to be covered. Even the branding of mares was a most difficult operation, and in many districts, it required great tact and knowledge of the people to get them to agree to it at all; and it is almost impossible to get breeders to treat their young stock sensibly, for which reason, the plan of buying yearlings should certainly be tried, more especially as many very young horses are annually purchased by agents for Native States and private persons.

All that might have been done has not been done, and no doubt mistakes have been made, but it must not be lost sight of that, in addition to the remounts taken into the ranks, a very large amount of stock, and some of the very best, is purchased by others than Government. In addition to this there is a consensus of opinion that very great improvement has taken place in the general condition of stock in the country, and a large number of animals are now produced, which would formerly have been considered excellent remounts, but are now not thought good enough, and which though not up to the highest standard, would be of immense value as a reserve in an emergency.

In conclusion, it is of immense importance, politically, to increase the amount and improve the class of stock in the country, and to do this effectually, much "nursing" is required, and a liberal policy towards the breeders; and, any measures, however excellent in themselves in other respects, which tend to frighten breeders and dealers and to cause them to abandon horse breeding, should only be adopted with very great caution.

The general opinion on this subject seemed to be that, as it was impossible to legislate against polo and pony racing, the facts must be accepted as they stand. The total number of polo and racing ponies in Northern India does not probably exceed 3,000, while the number of country-bred cavalry horses cannot be less than 12,000. There is moreover a considerable demand for country-bred horses in the lower provinces, the aggregate number now bought by well-to-do natives of those parts, being large, and these nearly all come from the Punjab. It therefore seems that while ponies are undoubtedly profitable to breeders, and the present demand is in excess of the supply, it is not likely that pony breeding, which is in itself uncertain, can increase to such an extent as to materially affect the breeding of horses. With regard to mule breeding the case is somewhat different, but then the mules themselves are most valuable for military purposes, and Government desires to encourage their production. The fact is that the class of horse now required for native cavalry is much superior to that of thirty, or even twenty years ago. The general demand for horses of this sort also appears to be growing, owing no doubt to the increased prosperity of the country, while production, though stimulated in some ways is checked in others. It therefore appears that native cavalry must either pay more for their remounts, or must follow the example of Government by buying them young and rearing them on runs until of sufficient age to be put into the ranks. The proposals on this subject will be found under I. A (b).

The idea of Government giving prizes at race meetings on the principle of Queen's Plates does not appear to find favour. The speedy horse of nearly pure thorough-bred descent which would carry off these stakes is not the sort of animal on which officers commanding native cavalry regiments would desire to mount their men. If Government are willing to spend money in encouraging the breeding of horses it is thought it would be better laid out in (1) giving more prizes at horse shows, (2) increasing the number of stallions, and (3) assisting the native cavalry with grants of suitable land on which young horses might be reared till fit to be put into the ranks.

III. RESERVE OF HORSES FOR THE ARMY.

MR. COX drew attention to this important subject. He said that at present there was no reserve of horses for the army, and no steps were being taken to form one. He pointed out in forcible terms the necessity of having a reserve of horses to supply the waste of war in which horseflesh always suffered severely. He thought Government should take up the matter which was as essentially a defensive measure as any other.

COLONEL DEANE admitted there was no reserve of horses. He had proposed that the system of registration referred to by Mr. Cox should be introduced into India, and that by this means some of the 150,000 horses in Native States should be made available for the requirements of war. For political reasons, however, Government was averse to call upon our native feudatories to supply mounted contingents in time of war, and in addition to register the best of their remounts for State requirements. It was also thought advisable to register horses belonging to the general public in presidency towns and elsewhere. The horses kept in reserve were barely sufficient to meet the current annual waste of the army and in time of war it would be necessary to resort to foreign sources of supply. These resources were ample, and schemes had been carefully drawn up by the remount department under which the wants of the army would be met on mobilization, by obtaining from abroad in a short time any number of horses required. He considered that the danger of importing horses from abroad owing to foreign cruisers in time of war was made too much of; that our East Indian naval squadron was quite able to render account of our enemies at sea, and that when this ceased to be the case, it was a case of "God help us."

The subject was felt to be too large a one for discussion at an informal meeting. There is a feeling, however, that Government should do something, since raw remounts, whether indigenous or foreign, are of no more value than raw recruits. With regard to native cavalry it is mainly a question of organization. If their depôts are of sufficient strength they may be fairly well relied on to keep up the complement of horses in the regiments on field service.

IV. GENERAL CONCLUSIONS.

I. (A).—With regard to the supply of indigenous remounts for native cavalry. The present system of purchasing by committees or by a single agent, has not, up to the present season, produced better remounts, or appreciably lowered the price. It continues to be unpopular.

The question of supplying remounts of the stamp now required, at a price within the means of regiments is a serious one, and will continue to cause anxiety to those most interested, even if the proposed increase to the pay of the men is sanctioned. Many officers of native cavalry think that the difficulty may be met, at least partially, by buying young stock and bringing them up on runs, each of which would be supported by a group of regiments. In fact by adopting a system similar to that which has been found to answer in the case of British cavalry.

I. (B).—The problem of supplying indigenous remounts to British mounted branches, if not actually solved, appears to be in a fair way of solution.

Except that there are no reserves, the method of mounting British cavalry and artillery seems to be considered satisfactory.

II.—Improvement of horses in India and increase of supply for army purposes.

(*a*).—Sir Edward Buck spoke on the transfer of horse breeding operations from the Military Department to that of Revenue and Agriculture. If the effect of this is to obtain an increased outlay on horse breeding, and to ensure greater interest being taken in it by district officers, without losing sight of the main object in view, that is, the production of indigenous horses for military purposes, it may be assumed that the change will be approved by officers of the army in general. The latter, however, have no direct concern with administrative questions.

(*b*).—On the subject of the class of stallions for India there are many ideas. The Norfolk Trotter is strongly supported by the horse breeding department, while public opinion seems to favour thorough-breds, and some think Arabs get the best native cavalry remounts. The latter are said to be favoured by native breeders.

It seems, however, to be generally thought that the stallions imported, whether thorough-bred or Norfolk Trotters, are not as good as they should be, and that, if necessary, the Government price of £350 should be increased. On the other hand the horse breeding department is satisfied with the imported sires.

There appears to be also a feeling that the number of stallions should be increased.

(*c*).—The number and quality of indigenous mares. Both generally thought to be satisfactory. Comment was made on the large number of the best mares taken into the ranks of native cavalry, leaving inferior ones to be bred from, but the question is one very difficult to deal with.

(*d*).—Free trade in horses, and the effect on horse breeding of the present system of buying by a single agent in each province. General opinion strongly in favour of free trade in horses in every way. The system of buying by a single agent, though theoretically advantageous to the interests of native cavalry, is open to some practical objections and appears to be unpopular with all concerned, breeders, dealers and regiments. It is undoubtedly opposed to the interests of the horse breeder and horse dealer, and is undoubtedly resented by both classes. If its operation, as stated by Mr. Robertson, is to check horse breeding it must of course make horses more expensive in the long run, and thereby injure the sowar for whose advantage it was instituted.

(*e*).—The effect of polo and pony racing on horse breeding. There appears to be good reason to think that at the present moment the high price of ponies is exercising a deleterious influence. But it is likely that this is only temporary, and in any case it is not probable it can effect horse production so much as the breeding of mules, which is approved by Government for obvious reasons. The only remedy appears to be to actively encourage horse breeding as much as possible. This may be effected in various ways—

1.—By removing artificial checks, such as purchasing for native cavalry through a single agent.

2.—By importing better stallions and more of them.

3.—By importing also mares, and (following the system which has been so successful in Germany) by setting to work to breed the exact class of stallion required for the country.

4.—By giving increased prizes at horse shows for the following classes :—

Brood mares, with and without foal (by Government stallion).

Three and four year old geldings fit for military purposes.

N. B.—No prizes to be gived to any animals (except mules) under 14 hands 1 inch.

5.—By giving plates at race meetings to be competed for by country-breds.

P. J. M.

CAVALRY FORMATIONS.*

By Captain G. O'Connor, Queen's Bays.

With a view to further threshing out this subject, and it is to be hoped, effectually disposing of the single rank theory, I propose to examine in detail the advantages claimed for single over double rank formations.

Before considering the advantages of one formation over the other, it will be advisable to bear in mind that cavalry combats being decided by shock action, the object of all formations must be to bring the greatest amount of force to bear on an opposing body at a particular point at a given moment, the maximum of force being attained by the solidity of the attacking party, and the speed at which it is moving.

Knowing this, it is difficult to admit that a primary formation in single rank can be seriously entertained. For, no matter how rigid the line may be before the gallop is commenced, to take up that pace all horses do not strike off with the same foot and at the same instant, and this causes croups to be thrown out in opposite directions and produces wavering; as the pace quickens the men must ride their horses; to do so the riding school position is dropped and, more room being required, insensibly the ranks open out.

Although the Regulations lay down, that the "charge" shall be executed at the highest speed of the slowest horse, in practice what takes place? The slowest horses drop behind, courageous men and fast horses come to the front, and then the object of the rear rank is fulfilled *i. e.* the front rank, the actual body executing the shock, is stiffened both in appearance and reality.

Superior ease and rapidity of movement over all ground.

Granted that in single rank, or "rank entire" the necessity for "taking order" would not occur; it is impossible to have "rank entire" pure and simple: and if only one or two men are on the flanks of the rear rank it is just as easy for a complete rear rank to "take order" over obstacles, &c., as it is for two or three men.

I cannot admit the superior ease and rapidity of movement; with properly trained cavalry the rate of movement of both ranks is equal, except at the final moment when every horse is exerting itself to the utmost. My own experience of "single rank" is, that it lacks that rigidity necessary to correct distances and intervals, the sure foundation of good manœuvring.

Simplicity in training.

Once a man leaves the riding school he is fit to ride in the rear rank, but to enable him to take his place in front, and not merely "follow my leader," a more extended training is necessary. I am not aware if there is the same difficulty in the native cavalry, but in British cavalry, with voluntary enlistment and choice of regiments, in every troop there are men whom nature never intended for cavalry soldiers, and the only place for them is the rear rank, all the training in the world would never make these men acquit themselves creditably.

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* *Vide* Journal of the U. S Institution of India, Vol. XVIII, No 75, page 108.

Outflanking.

In regard to prolonging the line with a view to outflanking, it must not be forgotten, that with two bodies of cavalry in collision, assuming them both to be equally determined and that one has not out-manœuvred the other, the impetus necessary to determine the combat favorably, must come from an entirely fresh body.

With the normal fighting formation of all European cavalry, any leader who tried by prolonging his first line to dispense with a support, would in all probability find the overlapping force caught in flank, in the very act of making its own flank attack. The power of attacking either to front or flank, by a body intending a flank attack, must be retained to the very last moment. This power a force in prolongation of the first line has parted with, the moment the line to which it belongs is committed to an attack.

The tendency of all recent attack formations has been in the direction of a strong first line executing a successful attack, the other troops having simply to complete the success, or avert the consequences of a repulse. An attenuated line, as a single rank one must become, would not possess sufficient offensive power to do more than hamper the movement of the other troops, who would inevitably have to be sent to its support.

To outflank the enemy it must be known how far his flank extends, and in what direction he is moving.

Both sides endeavour to conceal their strength and objective, and in this they are aided by the distance between them, dust, smoke, conformation of the ground, and various other causes.

Strength of squadrons.

From 48 to 60 files is practically the best strength for a squadron. If more than 60 files, the squadron is cumbersome and difficult to handle. If less than 48 files the intervals between squadrons become proportionately so great that there is a want of cohesion in the whole line.

In squadrons of the above strength the tactical unit will be found convenient for detached duties.

Ground scouts, &c.

These men with signallers, pioneers, &c. are (*vide* Regulations) placed in the rear rank. If you like to call it the serrefile rank it does not make the slightest difference to the fact, that behind your front rank you have a rank (possibly a skeleton one), for which provision has to be made. If these men alone are in that rank they will be the source of endless confusion in any other formation than line; in fours, divisions, or column they cause increased depth without any compensating advantage.

Markers.

This relic of the old pivot drill should certainly be abolished and this, after a time, would be followed by increased smoothness in working. At the same time it would be necessary for the "officer of direction" to have the point in changes of position, and the direction in advances, pointed out to him. Why should not the commanding officer give the direction of the advance? Thus—"the line will advance direction on (any named object)."

Whilst on this subject, I may mention that when drilling, some years ago on the sands at Dundalk, under an officer who always gave the direction, one frequently heard the command "the line will advance direction on the lighthouse." Although this savours somewhat of the horse marine I can testify to the good effected by the practice. If the direction of the advance is given, leaders and guides, after a little practice, get to know the necessary distance to the right or left they should lead and a great deal of unnecessary inclining is avoided.

Replacing casualties.

Not only should the men be accustomed to re-telling off to replace casualties, but the leaders should be practised in assuming commands vacant from the same cause. This is a practice which will commend itself to all cavalry officers who are aware of the necessity for quickly replacing a lost leader.

Intervals between squadrons.

The present interval, although an arbitrary one, is one with which all ranks have become so accustomed, that it would be gratuitously giving trouble to alter it; and, with the regulation war strength squadron of 48 files, does just give division interval.

Arms.

Taking into account the acknowledged casualties from the sword in the Franco-German war, and the fact pregnant with meaning, that the Germans have wholly and the French partially replaced the sword by the lance, it is worthy of consideration whether the time has not arrived for the abolition of the sword.

Even if the sword is retained, now that it is carried on the shoe case, it would be an advantage to arm all the line cavalry regiments with the lance.

Engaged as we so frequently are with semi-savage enemies, the lance is undoubtedly the most effective weapon.

Arming the front rank with lances, and the rear rank with swords seems impracticable.

An objection to the lance is, that in wooded country, and to scouts and men on detached duties, where the necessity of escaping observation has to be taken into account, it is an incumbrance. In dismounted duties the lance causes a little delay. But these trifling disadvantages are, I think, more than counterbalanced by its terrible effectiveness in the hands of strong men on powerful horses, like our British cavalry.

The revolver for all ranks is out of the question.

Double reins.

The object of giving the cavalry soldier two reins is, I suppose, that if in a *mêlée* one gets cut he has another to fall back on; also that for watering or leading purposes the bridoon can be used.

Suppose that instead of the present double rein, a single (the bridoon) be placed in the rider's hand; this rein to be of the same length as at present, and to have attached to it by buckles about two feet from the rings two straps forming the bit reins, these straps to be slightly shorter than the actual reins from the point of attachment to the rings. This slight difference in length, combined with the difference gained by the bit being out of the perpendicular when the horse is at work would give the necessary fulness to prevent the same cut severing both reins.

If the bridoon only is required, the bit attachment could be detached by simply undoing the buckles.

No alteration in the head stall would be necessary.

THE PROFESSIONAL INSTRUCTION OF NON-COMMISSIONED OFFICERS.

By Captain G. O'Connor, Queen's Bays.

Recently, an attempt was made to draw attention to the necessity of some system of instruction for non-commissioned officers; but with the exception of an order, allowing them to take up as extra subjects for first class certificates, either tactics, military topography, or fortification, the effort has apparently been without result.

This is the more to be deplored, as owing to the present conditions of warfare a high state of excellence is imperatively demanded from all in the position of leaders.

The importance of the subject will, it is hoped, be accepted as an excuse for again bringing the matter to the notice of those from whom the initiative in the direction of further instruction must proceed. Officers of all ranks are now making strenuous efforts to become more professional, they are not only required to be proficient themselves, but the efficiency of their command is, to a certain extent, made the test of their own fitness. Even the private soldier is expected to know something of the most difficult of all trades. He is now required to be both a machine and a sentient being.

Amidst all this striving after perfection, our non-commissioned officers are professionally in the same position they were years ago.

The tendency of all recent modifications in tactics, has been in the direction of requiring increased efficiency from subordinate leaders. We are taught, that on the skilful handling of men near them by subordinate leaders the result of every action depends. Also, that the proportion of casualties amongst officers has relatively increased.

We are thus presented with a problem, the correct solution of which demands immediate attention.

That solution will be found, I believe, in the levelling up, by means of increased instruction, of those who at all times have important duties to fulfil, and who by the exigencies of active service may be called upon to display qualities requiring careful preparation and diligent cultivation.

With apologies for introducing the King Charles's head of military writers, there is food for reflection in the fact, that the Germans have recognized this want, by instituting schools for the military education of their non-commissioned officers.

Owing to the spread of education, and the improvement in the *status* of the non-commissioned ranks, the class of men now filling those ranks is both educationally and socially higher than formerly.

The habit of receiving instruction, coupled with their comparative youth, places at our disposal good plastic material, capable of being moulded into any shape.

The means now provided by the regulations for the instruction of non-commissioned officers are as follows, and in reviewing their adequacy, I will restrict myself to the cavalry.

Books issued *gratis* by Government; squadron training; and special classes. The books are "Cavalry Regulations," "Regulations for Encampments," "Manual of Field Fortification," and "Musketry Regulations." The first named contains drill, all detached duties, and tactical dispositions against the other arms, but owing to the necessity of compressing the information into a convenient space, it is very technical, and requires a slight previous acquaintance with the theory of tactics. The "Regulations for Encampments" are not applicable to India. Unless the non-commissioned officer has been through a course of cavalry pioneering, the "Manual of Field Fortification" is beyond his comprehension, and consequently, never read. All these books are issued in the proportion of three or four per troop, and troop officers are held responsible for their safe custody. As a matter of fact, they are generally in the troop sergeant-major's possession ready for production at inspections.

The time available for squadron training, especially in India, is so limited, and such a variety of subjects have to be considered, that it is next to impossible for even the most energetic and painstaking squadron leader, to go over them in more than a superficial manner, or devote his attention to individuals. Neither has every squadron leader the faculty of imparting instruction, the possession of which gift assumes not only a thorough knowledge of the subject, but the ability to choose the ideas, and present them in a form most convincing to the listeners.

Special classes are formed for instruction in signalling, musketry, cavalry pioneering, reconnaissance, and transport; but for various reasons the number of non-commissioned officers attending them is limited. The special knowledge acquired is not always utilized for the general benefit; in many cases from want of practice it is forgotten, or else lies dormant, because other subjects, the vivifying influence of which is necessary to complete the instruction, have never been learnt.

Whilst advocating a measure of increased instruction in professional matters being given to non-commissioned officers, it is advisable to draw attention to the objection against their being converted into a body of argumentative bookworms. Practice in the field should invariably follow the theoretical training.

Advantage might be taken of the presence of non-commissioned officers at hill stations, during the summer, to institute classes for instruction in the rudiments of field works, tactics, and topography. If formed on the same lines as garrison classes, they could be either attached to, or under the control of, the Garrison Instructor. Men who had qualified in any of these subjects, would be of the greatest assistance in instructing the rank and file, instead of as now, taking up time which should be given to the men.

In the early part of the drill season, as an occasional relief from the dreary monotony of adjutant's drills, non-commissioned officers who had shown any aptitude for theoretical work, could be exercised against one another, in the attack and defence of outposts, convoys, small defensive positions, and bridges, and in the reconnaissance of positions, transmitting of information, &c.

As a general idea suppose the following carried out:—Two troops under Sergeants A and B parade at stated times. On parade the leaders receive instructions; Sergeant A to escort a convoy to a named place, Sergeant B to attack the convoy, both to return at a fixed time. Two officers acting as umpires accompany the parties, carefully note their dispositions, and send in reports. In the evening, the adjutant, or an officer detailed by the commanding officer, having assembled all the non-commissioned officers, and read over the instructions, and the umpires reports, calls on the leaders to explain their movements, mistakes are pointed out, criticism invited, and the whole subject thoroughly threshed out.

This may be thought rather an ambitious programme for non-commissioned officers possibly, but having seen such a system in operation, I can vouch for its efficacy in promoting a healthy spirit of emulation amongst the non-commissioned officers; obliging them to work up the subject, and at the same time cultivating their reasoning powers, and the habit of accepting responsibility. Amongst other advantages, the men take the greatest interest in work of this kind, and become staunch partisans, the officers get to know, in a thoroughly practical manner, their best non-commissioned officers, and, last but not least, junior officers have frequently an opportunity of observing mistakes to be avoided.

Once the principle is accepted, that our non-commissioned officers require and are worthy of increased professional instruction, there would be no difficulty about the details. Accustom them to the idea, that their position entails something more than making out returns, and the routine of barrack duties, and they will be found equal to the occasion.

THE ACCLES MACHINE GUN OF 1889, FOR MOUNTAIN, JUNGLE AND DESERT WARFARE.

By Captain H. C. C. D. Simpson, Royal Artillery.

Military literature has been so flooded lately with accounts of the marvellous performances of the Maxim gun, that machine gun enthusiasts may have overlooked the rapid strides towards the perfection of a machine gun, made by the father of these weapons of modern warfare, the old Gatling.

A recent announcement that the permanent Dress and Equipment Committee at Aldershot had been directed to devise the most suitable machine gun equipment for field service, seems to be an opportune moment in which to consider the claims of this particular pattern of gun, for employment under the circumstances stated in the title of this article.

Interested in the development of the use of machine guns, as an auxiliary to mountain guns in irregular warfare, I obtained an invitation from the secretary of the "Gatling Gun and Ammunition Company" to inspect their gun, and to receive a report from Mr. Accles, their constructing engineer, on the merits and de-merits of the various patterns of machine guns.

Construction.—The Accles Gatling of 1889 is constructed with a certain number of rifle barrels of the same bore as the magazine rifle, and of ten or six in number, placed round a central core. All the barrels revolve round this core by means of a crank passing through the trunnions, and worked at the right hand side of the gun. Each barrel is provided with a separate lock, which by means of a simple but ingenious mechanism placed in the breech, first discharges the cartridge and by a return motion ejects the empty shell. The barrels fire in succession, each barrel firing once, at every turn of the crank, or pressure of the trigger, so that one entire revolution discharges in rotation, all the ten or six cartridges in the chambers (see Fig. 1).

The feed is, however, the greatest feature of this latest pattern gun. It may be remembered that in the earlier modelled Gatlings, such as employed in Afghanistan in 1878, the cartridges were fed by gravity to them, by means of feed cases, or by a drum. The cartridges frequently jammed in feeding down from the feed cases into the carrier or receiver. In the newly improved "positive" feed, the mechanism never loses control of the cartridges from the time they leave the feed magazine, until they enter the chambers, are loaded, fired, and the empty cases extracted. It is impossible with this feed for the gun to fail in its operation, even when worked by men unacquainted with its use.

It consists of a drum made to contain from 64 to 120 cartridges, placed on the left side of the breech. Instead of the cartridges falling into position by gravitation, therefore, they are drawn out of their receptacles in the drum, and laid automatically, and with mathematical precision in their places in the breech. It follows obviously from this, that the gun can be fired in any position in which it is possible to place it, without exception, and where a feed case can be put on the gun, that is, at any angle of either elevation or depression, a great advantage for mountain warfare, and traverses a complete circle. The sight is on the right hand, and the pointing lever is on the left hand side of the gun, and passes under the left arm of the operator, who controls the firing by means of the pistol grip C (see Fig. 1) with his right hand, which throws the revolving clutch D into gear with the worm E, at the will of the operator. This revolves the barrels, and fires the gun. The clutch D is keyed on to the crank shaft so that it at all times revolves with the crank. The worm is free, and the crank shaft revolves without moving it, until the teeth on the clutch engage with the teeth on the worm at F. (The drawing shows the clutch out of gear.)

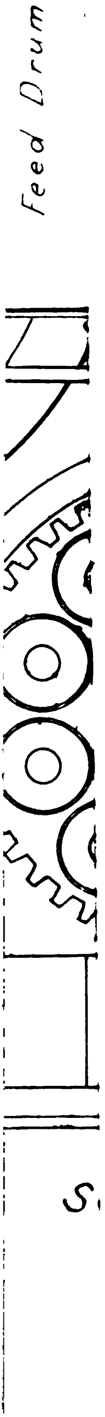
When extreme rapidity of fire is desired, the crank is removed from the side, and placed at the rear of the gun, and gives ten shots to one turn; when it is on the side, the gun fires ten shots in three turns of the crank, which is no doubt fast enough for all practical purposes. As the gun, just described, has never been in competition with the Maxim, which is considered by many to be, up to now, the most perfect weapon of its kind ever constructed, it may not be uninteresting to examine the advantages claimed for the former over, or in common with, the latter.

(a) Hang Fire.

In describing the operation of the Maxim gun, it is claimed that in case of a miss fire (the gun will not of course operate), the cartridges are thrown out by means of a crank. In rapid firing when the operator finds the gun stops firing, he immediately operates the crank to withdraw the cartridge, which may prove to be a hang-fire, instead of a miss fire. It will be clearly seen, that in this case, the Maxim automatic gun is then in the same position as any hand operating machine gun, as cartridges would be withdrawn by the hand crank and not by the recoil of the gun. Imperfect and bad cartridges have been known to hang-fire for over two seconds. This hang-fire difficulty has been overcome, in the new Accles machine gun.

If Mr. Maxim has an explosion inside his gun in the way in which he is liable to, his gun would appear to be completely ruined for the time. Whereas, if this takes place in the Accles gun, it has no more effect than a momentary stoppage.

If a piece of the cartridge case should be blown into the barrel, it will not completely throw the gun out of action, as the mechanism of that barrel can be instantly removed, and the firing continued with the remaining barrels.


Feed Drum

There are other points about imperfect cartridges which have to be considered, and which occur more frequently than hang-fires, *viz*, the blowing off of the cartridge head, breaking in two, tearing in two at the body or neck of the cartridge, thus leaving the remaining part of the shell in the chamber, and preventing the next cartridge from going in. In a case of accident of this kind, it is necessary to remove the piece from the chamber with special tools, or put the barrel out of action. In a one-barrel gun of the Maxim type, there is no alternative but to remove the piece from the chamber, which means, that the mechanism has to be removed from the gun, and a special instrument inserted into the chamber, to withdraw the *debris*, or in other words, the gun must be put out of action for the time being, an obvious inconvenience when dealing with the rush of a dense crowd of savages.

(b) Rapidity and duration of fire.

The new Accles gun surpasses any other machine gun in rapidity of fire, its rate being that of 1,200 shots per minute with a ten barrelled gun of 150 lbs. weight.

Owing to the heating of the barrel, it is impossible to fire more than 1000 rounds with any rapidity out of a one barrelled gun of the Maxim type, without over-heating and expanding the barrel, as although it is said to be immersed in water, it cannot be entirely so, as each end of the barrel and the working portions of it, are left exposed, and it is only a matter of time for it to become overheated and stop the gun. In firing a given number of, say 600, shots from each gun in the Maxim, they must all be driven through one barrel, which barrel necessarily receives all the heat of the said 600 shots ; whereas, a barrel of the Accles gun would only have $\frac{1}{6}$ or $\frac{1}{10}$ of the number of shots driven through it. When the original Gatling gun was built, it was designed to have water round the barrel, but it was soon found that it was not necessary, as it was proved that the gun could fire any number of shots that would ever be likely to be required of it at any one time on service, without overheating. This test was made at Fort Maddison in America, under the supervision of Commander Marvin of the U. S. Navy, when 63,000 shots were fired continuously without the gun overheating or hanging fire. The advantage of being able to dispense therefore with a cumbersome water-jacket in mountainous and desert countries, where water is scarce, is obvious.

A military writer stated recently with reference to machine guns as follows :—" It has been found after rapid firing, that the chamber of a hand-operating machine gun becomes slightly clogged with burnt powder, with the result that the empty cases adhere so firmly to the walls of the chamber, that the extractor is unable to work, and has even been known to break, and so the gun put out of action for the day."

If this statement is true, how is it possible with an automatic gun with limited power, to work perfectly when the gun is so clogged that the extractor will break off before the cartridge gives way. It is known from experience that the more shots you fire out of a gun, the greater the friction, as the cartridges become burnt in the chamber and cause them to stick. So, when using the small-bore cartridge, which gives less recoil and greater expanding pressure in the chamber than the Martini cartridge, if the firing is continued any length of time in an automatic gun, the rate of fire will keep falling off, and finally come to a standstill.

(c) *Weight and Accuracy.*

The weight of the Accles gun varies from 70 to 150 lbs according to the length of barrel and nature of service required. The six barrelled gun weighing 120 lbs., with 30 inch length of barrel, is that now recommended for pack transport in irregular warfare. It has a less number of pieces than the Maxim, and is mounted and fired from a tripod weighing 43 lbs. Its rate of fire is 800 shots per minute, against the 600 of the Maxim. The limit of range in which guns are likely to be brought into action in irregular warfare, is laid down at 3,000 yards, extreme range. The accuracy of the Accles gun at this distance is unquestionable, and the laying is made with a less elaborate elevating gear than in the Maxim. It is simply mounted to move in all directions and pointed by means of a pointing lever. The vibration complained of in other hand-operating machine guns, such as the Gardner, when fired by turning the crank, is obviated in this gun, by passing the crank through the trunnions or dead centre of the gun.

(d) *Feed Cases.*

The Accles feed magazine is absolutely positive in all its movements, and without any springs whatever, and can be readily taken to pieces for cleaning. It can be loaded by hand, as fast as the cartridges can be picked up. When using the filler to charge the feed cases, the cartridges are passed from the seal box into the magazine which is ready to be placed on the gun. These cartridges are not at any time exposed, so there is no danger of their being covered with sand, grit, or moisture. As the feed cases are made of brass they are not subject to atmospheric changes as is the belt feed of the Maxim.

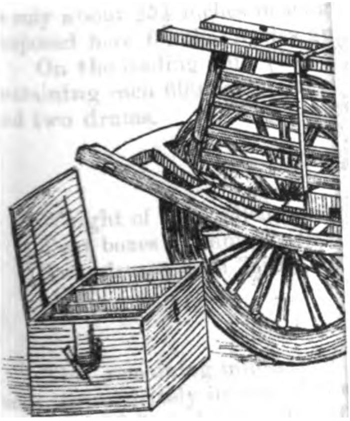
(e) *The Locks.*

The locks of the Accles gun are so constructed that they are always locked up with the same solidity all through the revolutions as when on the firing surface, so that it is not possible to blow back and injure the people working the gun. In most machine guns the firing mechanism is only locked or held tight against the cartridge while firing. When off the firing surface, the locking bolts are withdrawn, and the mechanism is free to be thrown back on to the people working the gun, which has, I believe, frequently caused death or injury to the operator with a gun of the Nordenfeldt type. Although one man can work the six barrelled gun, as in the case of the Maxim, three are recommended for a full detachment, allowing a reserve for a casualty.

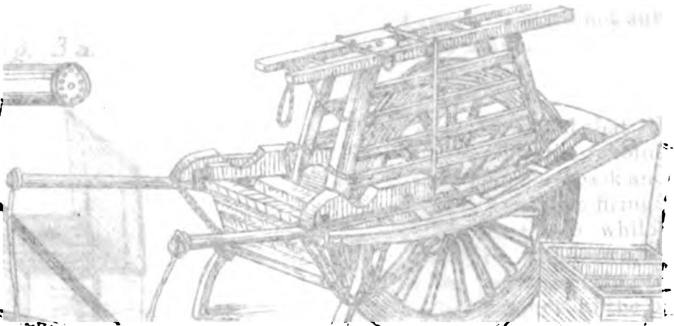
Fig.

Mountain Warfare

MODE OF MAN TRANSPORT SUG
FOR BURMAN JUNGLES.



C.J. Arbery


g. 3 a.

We have now dealt with the most important points that have to be considered in connection with the action of the machine gun, and I think it will be admitted that for irregular warfare, the six barrelled Accles gun must be a most efficient weapon, and steps should be at once taken for giving it a fair practical trial.

The general principles guiding the tactical employment of machine guns, as also their organization and equipment for irregular warfare, are subjects which have been so threshed out by military critics, that it is not necessary to deal with them in detail here.

An article in the R. A. Institution Papers, by Captain Lloyd, R. A., on the organization and equipment of a machine gun section in Burma, with its subsequent services in the Ruby Mines expedition, affords an excellent example of much that it is necessary to consider in these respects.

The diagrams annexed, show the various modes of transport suggested for the three conditions of warfare, referred to in the heading of this article.

(i).—In Fig 2 for mountain warfare, the six barrelled gun should be carried in the hollow *across*, instead of *along* the back of the mule. Although this mode of transport looks dangerous at first sight, when moving on a narrow way close along the face of a cliff, it is not so in reality, the barrel being of the same length as the 150 lbs. mountain gun, which was thus carried in Abyssinia, and approved. The load gets closer on to the back, its centre of gravity is brought lower down, and the length of the lever, with which the weight acts to upset the mule, thus shortened.

The strain is also more equalized in climbing and descending steep places. It is of course impossible to carry our service mountain guns in this manner, on account of their length, which is in the 200 ℔s. gun 41 inches, and in the 400 ℔s. gun chase portion, 45½ inches. But, as regards this latter gun, there is no reason why its breech portion, which is only about 25½ inches in length, should not be carried in the manner proposed here for the Accles gun.

On the leading mule (Fig 2) should be carried the gun, two boxes containing each 600 rounds of small-bore ammunition (service pattern) and two drums.

Gun Mule Load.

Weight of 6 barrelled gun,..................	120 ℔s.	(top of mule.)
Two boxes of ammunition, each 46℔s. =	92 ℔s.	(1 box either side.)
Two drums, each 3½ ℔s....................	7 ℔s.	(1 drum ditto.)

Total weight...219 ℔s. (exclusive of saddlery).

The remaining mules will carry ammunition; the ammunition mule, immediately in rear of the gun mule, carrying in addition the gun tripod of 43 ℔s. along the top of the saddle.

(ii).—For jungle warfare the gun can be carried either as the 150 lbs mountain gun in man transport, *i. e.* slung on bamboos and carried by three men, with one for the tripod, and one for every single box (600 rounds) of ammunition (46 lbs.) in addition: or, where there is a narrow, rough track, as in many of the Upper Burman jungles, the gun can be transported on a form of carriage (see Figs 3 and 3a) which can be rudely constructed at the base of operations.

(iii).—For camel transport (see Fig 4) the gun is pivoted on a strong iron semi-circular bar, itself pivoted on the front arch of the cradle, which is additionally broadened and strengthened.

Four drums, each containing 65 cartridges, rest in a groove—two on either side, projecting from the cradle. A camel driver is mounted on the camel, as in the old days of the Persian camel artillery.

Gun Camel Load.

Weight of gun....................................120 lbs. [of drums).
Ammunition in four drums (200 rounds).. 27 lbs. (including weight
Weight of native camel driver............130 lbs.

Total weight......277 lbs. (exclusive of saddlery).

The first two ammunition camels carry 1,200 rounds each. A gunner is mounted on each of these camels, and the third number of the detachment, the No. I. in charge, is mounted on a small horse, as in a camel mountain battery. The camel driver mounted on the gun camel, is responsible for the three camels in action.

First two Ammunition Camel Loads.

Weight of 1,200 rounds in boxes....... 92 lbs.
Weight of gunner & kit, about.........160 lbs.

Total weight......252 lbs. (exclusive of saddlery).

The other ammunition camels carry 3,000 rounds each, with one man leading every two camels. The gun in this form of transport is fired from the back of the camel as was the case in the Persian camel artillery. The gun has no recoil, and the animal being made to kneel on the ground with his legs tucked under him, the upper arm if necessary being lashed to the shank, forms a steady platform. The number laying the gun, remains in the saddle. There is a tendency amongst the old school of mountain artillery officers, at present, to advise weights which would overload ordnance pack animals. Those who argue in favour of increase of present weights for mules, forget that for service in the Bhutan expedition of 1864, the Government of India had to apply to Woolwich Arsenal for the construction of a lighter gun than the 252 lbs. gun found too heavy for mule transport in a mountainous country. In allotting the loads to the animals, endeavour has been made here not to exceed the proper limits of weight for each class.

As is customary in our irregular wars, where an intimate knowledge of how to meet the difficulties of pack transport, and the tactical

movement of guns is necessary, machine gun sections, when required, should be formed from the mountain artillery. The Accles machine guns would form an auxiliary to the mountain guns, their fire, under certain circumstances, even taking the place of that of artillery case or reversed shrapnel. To those who would like to hear more of the gun under discussion, I would call attention to a lecture delivered recently at Manchester, on machine guns, by Colonel Rogers, whose opinion, together with that of Major-General Arbuthnot (late) R. A., is, that the Accles gun has a great future before it, not being of sudden growth, but built up by the experience of years of service.

THE MILITARY DEFENCE OF THE EMPIRE.

By Major Martin Martin, R. E.

Many men perused with interest and profit the articles on the condition of the States of Europe which appeared from issue to issue in the *Fortnightly Review* some two years ago from the pen of Sir Charles Dilke. The last of the series was an able article on the political and military position of Great Britain.

These articles bear the stamp of the writer's familiarity with modern diplomatic history and with the risks that we as a nation lie under, from our obligatory engagements, from our peculiar position, and from the temptations which our riches and our unpreparedness for war offer to foreign attack.

The author disclaims, however, to speak with military authority, and on our military position, discourses at second hand, quotes from tainted and biased authorities, and in no case submits his military speculations to the same scientific analysis which he so ably employs in formulating his political deductions. It is, however, quite possible to employ the same methods to both aspects of our national strength and it appears somewhat curious that the attacks which are made by the very numerours body of home critics of our army are, as a rule, levelled against some detail. Sir Charles Dilke, for instance, enters into considerable detail on the recent horse artillery reductions and, though attempting reticence and pleading his unprofessional standing, is yet sufficiently discursive to show his ignorance of that branch of the service.

Other critics, again, go mad over the comparative trifle of sword bayonets and cutlasses and the commander of a volunteer artillery corps indignantly demands that he may be supplied with fully tested weapons, apparently forgetful that the necessity of his being required to handle artillery in earnest has never been considered sufficiently serious to cause his corps to be "told off" to any battery of guns yet in existence, and that the wildly improbable case of artillery making use of sword bayonets has neither occurred to the regular artillery nor would the contingency afford them the slightest concern.

While, however, such matters as these are acrimoniously debated the great question of national organization for defence remains with us—a phrase.

Already we find ourselves, as a nation, engaged in a gigantic commercial struggle with Germany, with America, with Japan even, the prize of which is continued existence, and even the physical subsistence of our millions of fellow subjects.

It is customary to speak of this struggle as one superseding the actual shock of armies. Is it so?

Is it not rather the probability, logically amounting to a certainty, that when increased population renders present commercial competition more keen, then one nation will endeavour to break down opposition with the sword?

May not straitened circumstances, amounting to actual starvation, render warfare a necessity to be averted by no compromises, by no arbitration?

Does not every year of peace with its additions of millions of mouths to be fed bring us nearer to the inevitable war, the necessity for which we all deplore, the same kind of war that is waged between fish in the ocean, viz:—that we must swallow each other in order to live?

It will not be the best army, but the nation best organized for war by land and sea which will emerge from this cold-blooded strife the victor and swallower of those who compete with it for food.

Spread over the globe in a string of possessions created by the enterprise and prowess of our ancestors, the possessors of a commerce commenced by piratical incursions on the older empires which we have in the past driven from the seas, we now find the posts and colonies which we have established, and by which we are supplied with food threatened by the levelling tendencies of modern invention and locomotion which have placed several foreign states almost on a par with ourselves by sea and land.

Contemporaneously with the necessity which drives Italy and Germany to seek an outlet for their superabounding populations in colonization we also find ourselves under the necessity of using each and all of our colonies as centres from which we are forced to expand, and the increasing congestion at home already warns us that our rate of expansion must be quickened at the very time that the pressure of foreign occupation is found closing round the avenues of expansion yet open to us in Asia, in Australasia and in Africa. Surely then it is time that we commenced to knit the Empire together by one comprehensive scheme of military organization which, *however small the embodied units might be in peace*, would allow of rapid expansion to the extreme point, which would utilize every man, every horse, every ounce of iron, quarter of wheat and bushel of coal in defence of the common interest wherever this might be threatened. Very possibly the present peace establishment need not be in any way increased if the actually embodied units of men and horses (and of military and naval manufacture and supply) represent every possible source of supply and are capable of expansion by drawing from all provinces of the Empire those resources which we have not yet commenced, even in theory, to tap.

When speaking of resources, it is usual to suppose that military resources mean only men, horses, guns and biscuits, whereas there is hardly an object in the universe which is not already useful in war or capable of being used for such purpose. It therefore becomes of the first necessity not only that our most highly trained troops should be distributed where, as from a focus, each unit may leaven that portion of the nation not actually or permanently under arms, but that our military factories and arsenals may be also distributed so as to ensure the immediate command of a wider scope of supply of material than can be concentrated or dealt with at Woolwich, Elswick or Enfield and that a general decentralization may render each province more nearly self-supporting by establishing the means of mobilizing the armed force of each district in the district itself.

Quitting for the moment all other ingredients which go to compose an army, what is our present system for drawing on our immense resources of fighting men?

The warlike races on whom we can count to furnish recruits are as follows—

Caucasians—English, Scotch, Irish, Australians, Canadians, &c., and some Maltese and Spanish subsidiaries—Greeks and Turks in Cyprus, &c.

Asiatics—Pathans, Sikhs, Gurkhas, Chinese, Malays, Arabs and such of the Hindustanis as come under the head of "warlike."

Africans—Zulus, Kaffirs, Soudanese, Arabs, Fantis, Houssas, Ashantis, Zanzibaris.

Australasians—Maoris.

Americans—Red Indians.

West Indians—Negroes.

Of these it will be noticed that we employ very few as a portion of our regular army, although lately we have made advances in employing Malays in our eastern battalions of submarine miners and Zanzibaris in our expedition in relief of Emin Pasha.

Many of these warlike people remain as untouched for our military wants as are the coal and iron of our colonies for purposes of military manufacture.

At the same time we continue to live in a ridiculous and costly dread of our native Indian army and that of the native states, much of it composed of material known to be of small value before an enemy, but sufficiently formidable to ourselves to retain a large body of British soldiers in the plains of India, maintained at great expense and kept up to strength in spite of cruel waste of health and life.

Mark also that in time of war this portion of the British garrison of India would not only be more strictly tied down to act as police, but would even require to be reinforced.

A few Soudanese, Zulu, Arab, Malay, Chinese and West Indian battalions quartered in India with alternative depôt battalions in their own homes would vastly simplify the garrisoning of India besides affording a nucleus for a very large force to be raised, if necessary, in time of war.

Foreign service of this description would immensely improve the *status* of the West Indian force and increase its experience, self-respect, efficiency and popularity.

Again, glancing at the various and unequal elements from which we draw our army, it is instructive to note that we make little or no distinction between the tasks we set to our best troops and to our worst.

For instance we use a fine British battalion to garrison Gibraltar and often send the most worthless among the Hindustani battalions on service in the field, partly in the endeavour to blind foreign States as to inequalities in our material which are well known to all.

Surely the rule of suiting means to ends should lead us to remodel the manner in which we garrison fortresses, so that at least a proportion of each garrison might consist of troops whose chief value is to fight behind walls.

The advantages of utilizing Hindustani troops as a portion of the garrisons of such places as Malta, Gibraltar, Jamaica, Bermuda, Thursday Island, Mauritius, Ceylon, &c., would not be exhausted by the relief afforded to British troops but would possess the extra advantages of habituating Hindustanis to service abroad and of acquainting the natives of India with the extent and variety of our Empire. This would prove a valuable means of education and tend to break down caste influences and oriental bigotry. We already use Sikhs as military police in Singapore and Hong-Kong and all the advantages so gained would be equally acquired were other races employed in assisting to garrison India.

The same interchange should undoubtedly be gradually introduced among our Caucasian regiments.

In every colony at least one British battalion should be stationed as a centre of instruction and unification, while the colonies should share in the garrisoning of England, Ireland, India, and our Mediterranean and foreign possessions.

It does not follow that the instruction would be all on one side; the British have as much to learn from the colonists as these have from ourselves, but the fact that there is a double advantage to be gained tends to enhance the necessity for reaping it if practicable.

It may be said that the system of reliefs would be costly, intricate and therefore impossible.

Difficulties would occur and would doubtless be overcome, and surely it is better that these should be found out and arranged for in peace than suddenly encountered in the midst of war, for if there is one thing on which we are agreed, it is that in time of war we should be bound as an Empire mutually to support each part the other, and such a complicated service as the defence of the Empire cannot be too carefully rehearsed in every detail.

As to the expense, this might possibly be met in part by utilizing military reliefs as marines and undoubtedly compensation might be effected by producing on the spot as far as possible those articles of military necessity, which we now solely produce from a few factories, including arms of every sort, clothing, ammunition and stores.

Enormous moral advantages to the Empire are gained by the constant interchange of battalions between home and foreign stations including more education than can well be measured and of the kind which has formed a principal reason for the establishment of the Imperial Institute; while nothing but loss can accrue from carrying coals to Newcastle, rice to Madras, or sugar to Jamaica, which has been too much the practice of our departments.

Recrossing some of the ground hastily noticed, it has been suggested in these pages that some extra efficiency might be given to the local forces of our colonies by quartering therein some units of our regular army (batteries, squadrons, regiments or battalions).

These could (economically) only be withdrawn from India and would be replaced there, in part, by colonial white troops, in part by varying the composition of our coloured army so as to include other troops besides natives of the country, while room exists for a large expansion of the white volunteers of India and even for the formation of a permanent white militia or military colonist force, located along the whole chain of mountains which shuts out the peninsular of Hindustan from Russian attack.

Already the volunteer force of India numbers 15,000 men (chiefly white).

The volunteer reserve, now being formed will considerably raise this total, as the whole white non-military adult male population of India considerably exceeds 60,000 and it is hoped that a very large proportion of this body will at least enrol their names, many eventually qualifying as efficient reservists.

But, beyond this, various influences are at work which must inevitably lead to a large increase of semi-colonist Europeans along our northern and north-western frontier in India.

It is proposed to construct a railway into the vale of Kashmir, the happy valley and Switzerland of the East. Already at Srinagar, the capital, the beginnings of a white settlement have been made and if fostered the population will increase rapidly.

Simla is fast becoming a large European city, the buildings are spreading over all the neighbouring hills and are assuming a solid and permanent type which ten years ago was unknown.

Public institutions are multiplying and as far as science, art, literature and arms are concerned, Simla is in no way behind Victoria, Sydney or Quebec, while the completion of the railway will further accelerate the growth of this capital of the Indian empire.

Large schools already turn out annual contingents of white youths and girls all looking for a living in the East (for where else can they turn?) and the same influences are at work at Murree, Darjeeling, Mussoorie, &c., and even in the hill regions of Baluchistan and Afghanistan, in which lie our military stations of Quetta and Peshin and their appended lines of rail and road to Karachi on the sea, and to Dera Ismail Khan and the large system of railways, which is to connect western and eastern India through Bhawalpur and Delhi to Calcutta.

So again it is in Assam and will be in Burma.

It matters little whether the first advances into a new district are for state (military or political) purposes or in the interest of commerce.

In one case commerce follows the military occupation, and in the other the commercial venture, if successful, results in an increase of military force.

If this force be a volunteer one so much the better for the finances of the country; and in India more imminent danger and the remembrances of 1857, give a value and dignity to volunteering which is not reached elsewhere.

While, therefore, we have every reason to be grateful to an organization which has added to the 60,000 regular British bayonets an increase of 1/4 or 15,000 volunteers it behoves us by every effort to hasten the processes by which these numbers may be increased tenfold, when we shall hold India on a cheaper and more secure tenure than we do now, and our regular army will be more free to operate elsewhere.

Railways (ordinary and mountain), roads, solid buildings and local arsenals are all of them needed from Government aid and will be furnished if pressed for, but there seems no reason why private commercial enterprise should be so slow to join with the Indian Government in developing our northern and north-western frontier.

Under John Company every independent European, whether planter or trader, was apt to run foul of the civilian rulers of districts who governed somewhat dictatorily and disliked independent Englishmen within their *pashaliks*; those days have gone by, but not the tradition of despotism which still hinders English speculation in India.

A very good trade is, however, now done by Anglo-Indian brewers in the hills of India, as well as by those who have started factories of boots, saddles, and woollen stuffs. There is ample cheap water power in various parts of the Himalayas and there are great opportunities for fruit and wine culture, dairy farming, silk cultivation and many other industries.

Coal, iron and petroleum are all to be found and worked in a climate which is certainly superior to that of Florida or Queensland and the disadvantages of which are ameliorated, if not eradicated, by continuous occupation and sanitation.

Should it be true that gold has been found in any quantity in the lovely and healthy Kulu valley a great impetus may be given to occupation by whites.

Competition with the Parsis may be occasionally severe to merchants but so it is with Germans and French elsewhere; still there are many English merchants and shopkeepers who do successfully compete at the few trades which have as yet found British representatives in India.

As to the safety of the country, from Kandahar to Bhamo it compares most favourably with Ireland and both life and property, even on the frontiers of Afghanistan and Thibet, may be considered absolutely secure.

The point of colonization of the mountains of India has been thus dwelt on because of the wasteful nature of our present military occupation.

The Government now sends out 6,000 British youths annually to India who mostly waste their energies in the plains and if they do return to England do so having done nothing to increase the permanence of our hold on the country and are thrown as unsuccessful applicants on the already congested labour market in England.

Happy those who can enter the police!

The alternative appears to be that either with or without Government aid a mixed contingent of young men *and young women* (the proportion of women to be gradually increased year by year and the whole selected so as to be capable of taking part in the various industries already indicated as available in the Himalayas) should be annually planted out in the mountains.

Such is the Russian plan and by advancing step by step in this manner, breeding as they go, they hope to beat us in Asia, and are sparing of neither men, money, nor energy in the attempt.

If necessary these colonists might be expressly and technically educated at home so as to fit them for the exact work to be taken up on arrival and we are already dimly perceiving some such necessity in establishing technical schools.

Such plantations have been successfully effected by Nebuchadnezzar and others, without the advantages of steam or science, and in the solution of this difficult operation might be found, not only a cheap means of occupying the strategical positions which protect India, but some relief might be afforded to the miseries caused by over population in our own cities and in Ireland.

Gradually, and concurrently with the growth of an European British population in the Himalayas, the abandonment of the plains garrisons would be carried out, and eventually the dream of the philanthropists might be realized and *the plains* of India left to govern themselves under our protecting colony ready to pounce on them from the hills, or on Russia if the danger to our Indian empire came from that side.

Something of the same policy should undoubtedly be attempted in South Africa, reading Kaffirs and Zulus for Indians, and Germans for Russians; but slow as is the progress of South Africa it rests its increase of power and white population on voluntary emigration and its commercial prosperity on independent enterprise. The action of Government has cramped and delayed South African expansion, but in India the Government stands instead of, and therefore against, voluntary effort and enterprise.

In other colonies where there has been no injudicious interference from home, progress has been more rapid, but in varying degrees the Colonial Governments have leant on the Home Government for imperial defence, to which they have themselves contributed an insufficient sum of money and quite an inadequate tribute of blood.

All these proportions should now be revised and while each portion of the Empire should be made as self-supporting as possible there should be a margin from each, in men, money, horses and material available for any purpose of military defence and especially for that most effective form of defence which is known as attack.

Table A shows the present and proposed organization and distribution of regular infantry battalions for defence and attack.

The main differences are:

I.—The proposal advocates the employment of a small, permanently embodied force of regular infantry in every centre where a race exists capable of bearing arms.

This small body would be the nucleus of expansion in time of war.

II.—The proposal substitutes a great variety of coloured races for a large portion of the Hindustani garrison of India thus

of	Socotra and Perim.	Egypt and Equatorial Provinces.		Ceylon.		Mauritius.		Cyprus.		Straits Settlement.		Thursday Island.		Bermuda.		Total.	
British	½	4½	2½	1	½	1	½	½	1	1	½	0	0	1	½	140	138
Colonial	0	0	0	0	0	0	0	0	0	0	0	0	½	0	0	0	22½
Maltese	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2
Gibralt																	
Turks																	
Greeks																	
West I																	

mitigating some of the most threatening apprehensions of mutiny and involving the further reduction of a good many battalions of Hindustanis, incapable, or little capable, of bearing arms.

III.—Further provision against Indian revolt is taken by employing a small proportion of Hindustani regiments beyond sea at Bermuda, Thursday Island, &c.

These, besides being hostages for good conduct in India, relieve a small proportion of British troops from countries unfavourable to British life and health although quite suitable to the native of India.

Hindustanis now settle freely in Natal, Zanzibar, Mauritius and many other places, hence the proposal is not revolutionary, but in development of a tendency already initiated.

IV.—One European unit is employed as an instructional and welding unit in every great colony.

The necessity of forcing the growth of the imperial sentiment is further illustrated by the local ebullition in Manitoba where at present local advantage takes precedence over imperial policy.

V.—The scheme, as roughly sketched out, also provides for the very gradual abandonment of the plains of India by the white soldier, which would become possible by (a) the gradual colonization of the Himalayan districts by whites, which is already progressing, but which requires recognition and greatly increased efforts, and (b) the completion of the strategical system of railways admitting of frequent military promenades from the hills and providing for the subjugation of the plains whenever necessary.

The colonial militia to replace eventually some portion of the regular battalions now sent from England.

The foreign coloured element (West Indian, &c.) to be retained in the plains of India and possibly increased as the force gains in stability.

VI.—It has already been stated that reliefs by sea would occasion some difficulty.

Roughly calculated this would be as follows:—288 battalions require relief by sea (subject to the following deductions, Sikh, Pathan and Gurkha regiments which do not leave India, in the greater part of which continent they serve practically as foreigners so far as sympathy with the Hindustanis goes)—*i. e.*, 240 battalions are relieved by sea every six years or 40 battalions per year.

Many voyages are short, some are long. The average time of relief by sea would be overstated at three weeks—*i.e.* (allowing for repair) a vessel would be required one month for each relief, hence, $\frac{40}{12}$ or four vessels capable of holding a battalion and working $\frac{3}{4}$ of their time would effect the infantry reliefs.

The Indian troopships are five in number, hold more than a battalion, and work only half the year. By adding the other transports and keeping the whole working all the year round the reliefs might easily be effected.

(Cavalry and artillery are not touched on as each requires different treatment in detail and the argument is one of principle, illustrated in detail for infantry only.)

VII.—As to expense, the battalions are slightly increased in number, but the numerical strength of the whole could be equalized with present numbers of men if the battalions were each reduced in peace to $\frac{5}{6}$ths of their present strength.

It is however doubtful whether the colonial money contribution to imperial defence is now sufficient, and as (in order to equalize the blood tax) units are allotted to each colony in proportion to the value of the fighting races they can furnish for imperial purposes and not in proportion to their wealth or population, it becomes evident that the whole military expenditure of the Empire must be defrayed from a money levy founded on the principle of the poll tax and applied to all. The larger proportion of British and colonial highly fed, highly paid troops would of course, cause extra expense and many of the coloured races would be more expensive troops than the grain fed Hindustani sepoy, but the gain in efficiency would repay the increased cost, or if economy were the great or ruling consideration it might be effected under the proposed, as it is under the existing scheme, by reducing the numerical strength of the cadres in peace.

It is to be remembered, however, that much of the expense of maintaining troops comes back to the country in which they are quartered in the shape of custom.

Offer the down trodden Irish in Limerick to remove the regiment of Saxon usurpers quartered in their city and they will tell you with perfect truth that they would be ruined in large numbers by any change of the kind and beg as they have actually done, that the usurpers may stay.

VIII.—Turning to particular increases and decreases made in Table A these have been roughly and tentatively made with a view to the exigencies and possible developments of the future, rather than as merely skeleton garrisons to hold our garrisons "on the bounce" in time of peace only.

For instance, Greeks and Turks are now employed as armed police in Cyprus. It is here proposed to raise two battalions of Greeks and two of Turks, each race having one battalion in Cyprus and one in Egypt. The home battalions still undertaking the military police duties of Cyprus.

In case of war with Russia these troops would be the leaven of the force to be raised in Asia Minor and the British officers who had served in the Turkish and Greek battalions would naturally, as acquainted with the troops of these races, be invaluable in forming such Asiatic corps as we may then require.

Again the garrisons of Egypt, of the Cape, and of Natal are in the proposal increased and largely furnished with heat-enduring races with the view of following up on all sides such further advances into the heart of Africa as we may be driven to make by the inexorable pressure of the "commercial" competition which forces us, willing or not, into the solitudes and dark places of every continent.

Such an advance is the Emin Pasha expedition, undertaken from honourable and philanthrophic motives but with a very solid substatum of self-interest which, we may hope, may lead to the advance being made good and converted into a new protected trade route under British guidance.

Similar steps in advance were taken in the expedition of Sir Charles Warren to Bechuanaland and in the recent annexation of Zululand, and all these can only be regarded as halts by the way, since advance will not cease in Africa until the British nation (possibly quadrupled in numbers and in emigrating force) has riddled the African continent with railways, roads, and steam communications in the same manner as already effected or half effected in Canada and India.

The truth is that we have grumbled long enough at the extent of our Empire.

Our circumstances and our wants invariably oblige us to increase that extent almost month by month, and it would be well if we reckoned with the inevitable and accepted its tendencies.

Let anyone read the actuarial calculations as to the present and future rate of increase of population in Great Britain, let him visit the suburbs of our great and of our smaller towns and see the spread of brick and mortar and he can hardly fail to recognize that such pressure in the centre of our national life mus tbe compensated for by expansion at the extremities.

The revival in trade and manufacture at home due to accelerated progress abroad more than compensates for the costliness of the means employed.

Having swallowed India and a large portion of America it is ridiculous for us to make wry faces over the rest of the meal still left for us in Asia and Africa.

It is also blind reasoning to suppose that our further advance will not be contested or that by merely wishing to remain within our present boundaries we can succeed in resisting the enormous internal forces which propel us outwards.

NOTICES OF FOREIGN CONTEMPORARIES.

Revue Militaire Belge, (quarterly) Vol. II.

This journal contains a description of a new military hospital, constructed at Brussels not long ago at a cost of 2,700,000 fr. It is capable of accommodating 330 sick, each bed thus costing 8,333 fr. A comparative list of the cost per bed of some of the principal hospitals in Europe is then given. The Hôtel-Dieu de Paris heads the list, the cost per bed being 30,375 fr., St. Thomas's, London, coming next with 19,425 fr. The principal fault which the visitor found was that the regulation of the ventilation was left in the hands of the patients; otherwise the arrangements were good.

Next appears an article on arms of modern warfare, which goes very closely into the details of the mode of action of various explosives.

The remainder of the journal is taken up with a long history of the Balkan peninsula, which the author regards as the theatre in which the drama of the eastern question will be played out. The history commences from the earliest times of Constantinople and is carried up to the present date. It describes the development of events, the gradual dismemberment of the Ottoman empire, the defences of Constantinople and the Russo-Turkish campaign. All the best authorities have been consulted on the subject, and the result is an exceeding interesting essay. The article, which is anonymous, is to be continued.

Revue Militaire de l' Etranger, (fortnightly) August and September.

Part I opens with an article on the subject of operations by night. It is somewhat remarkable how much attention is being directed to this branch of military science in foreign armies, and not only theoretically, for night operations form a part of the programme at most camps of exercise and autumn manœuvres. The article begins by dealing with the subject of night-marches, and gives as instances of the successful accomplishments of the same, the retreat of the 13th French Army Corps after Sedan, and also the defeat of the Federal Army before Chancellorsville by the skilful movement executed by General Lee, commanding the Southerners. Whilst admitting the tremendous advantage of a successful night manœuvre, the writer points out the extreme riskiness of such movements and the principal difficulties to be overcome. The opinions of various foreign authorities are then quoted as to the best means of training troops to accomplish night marches successfully.

Part II deals with the question of picquets and sentries by night, and from numerous examples the author points out the absolute necessity for specially training the men by night for these duties. This is a point on which our army might with advantage take a hint.

Amongst other articles which are of minor interest appears one on the subject of the English army. Unfortunately it is taken up more with details, than general criticism. As regards conscription the writer considers that the English as a nation are far too conservative to adopt the continental system, and without it he is of opinion that our army cannot be of any practical value as compared with that of other European powers. To quote his own words "c'est ni l'armée d' Alexandre, ni la nation armée."

A striking example of our conservatism the author sees in our *feu-de-joie*, which he traces back to 1654. This ceremony appears to him, and with justice, peculiarly antiquated and ridiculous, and indeed it is difficult to perceive why the explosion of so much gunpowder should be considered an appropriate way of expressing one's loyalty on the Queen's birth-day.

The marked difference between our paper strength and our actual strength does not escape his notice. With reference to the mounted infantry he does not think that the advantages have been decisively demonstrated, and points out the difficulties of properly adjusting the cavalry and infantry side of the question.

There is also a full account of regimental transport trains in the Russian army. It appears that they did not find their former system answer in the campaign of 1877-8, and so a special commission was appointed which continued its labours till 1885, the result being the present system described. Roughly speaking the train consists of 43 one-horse wagons, 39 two-horse, and four "lineikas" drawn by four horses; the two former are for the carriage of ammunition, medical stores, provisions, officers baggage, &c., and the latter for the conveyance of sick and wounded The *personnel* amounts to one officer and 103 men.

Under the heading of "Military News" is given a short account of the Military Field Sport Society in the Russian army. In October 1886 an order was published laying down that a certain number of men in each regiment, chosen for their resolute characters and robust constitutions, should be specially detailed for the pursuit of field sports of all kinds with the object of training them to become good scouts and judges of distance and locality. Now this system is to be carried still further and a similar society is to be formed both to develope the same qualities amongst the officers, and to afford the opportunity of indulging in sport under the most economical conditions. There will be a committee of management to organize *shikar* parties, and a general meeting will be held every year to settle questions of close time, frame new rules, &c.

It will be most interesting to obtain further information as to how the scheme works. Happily our officers are imbued with sufficient love for field sports not to require much urging in this direction, but there are many who are deterred from indulging in it, as much as they might, by the expense, difficulty of making up parties, and obtaining permission to shoot in many well known jungles, &c. Would it be altogether impossible to organize some society of the same sort with us, not only for *shikar* but exploration? To the latter object Government might lend a helping hand. As matters now stand cold water is generally thrown on all attempts of officers to penetrate to little known districts as for instance Thibet, Kafiristan, the country on our North-West Frontier, &c.

The Russians in this respect are far ahead of us, and expeditions are constantly being sent to parts of Central Asia, to say nothing of private ventures.

Revue du Cercle Militaire, September.

No less than five numbers of this Journal make their appearance in this month. The number of articles is far too great to give even a brief description of each, but noticeable amongst them are the following:—composition of a *corps d'armée*; transport, the development of the torpedo; mountain batteries; restoration of the memorials at Sebastopol in honor of the French, who perished in the Crimean War; and a description, with plates, of M. Contelle's apparatus for manufacturing hydrogen for balloons, which was shewn at the Paris Exhibition.

Writing on the subject of the visit of the German Emperor to England a correspondent exhibits a natural reluctance to attach the same importance to it that the Germans do. He discusses the merits of the German fleet, and finds that their ships were more clumsy in construction, but that their men though somewhat young in appearance were very smart, especially their marines, and the general strength of their crews much greater than in the British ships.

Further on he prophesies the ruin of the Krupp firm in consequence of the invention of smokeless powder and the necessary abandonment of steel in the manufacture of guns.

Ornithologists and lovers of nature will read with regret of the intention of the Prussian Minister of War to take measures for the destruction of all birds of prey, the buzzard alone excepted. The object of this measure is to ensure the safety of military carrier pigeons in the event of war. What arrangements will be made to prevent the arrival of migratory birds of prey has not yet been divulged.

Voyenni Sbornik.[1]

The August number commences with a description of the passage of General Skobeleff's detachment across the Balkans, and the fight at Shinova, (continued from a former number), and a history of the Krasnovodsk garrison from the time of it first being formed.

In an article on the cavalry question, the writer begins by stating that the cavalry soldier above all others should be distinguished by all the good qualities which go to make up a man, and than gives his reasons. The corporal frame which is to contain all these superlative excellencies, however. in his opinion, should not exceed 5 ft. 7 in. and may be as low as 5 ft. 5½ in. He dwells on the importance of the fact that a few bad riders in a squadron impair the efficiency of the whole to point out the absolute necessity of having maneges, so that equitation may be practised in winter as well as in summer.

Another article on the subject of instruction in riding for the cavalry, somewhat in a similar strain, leads us to suppose that the seat of the Russian cavalryman leaves something to be desired. Surely this cannot refer to the Cossacks, of whom we hear so much !

The remainder of the journal is taken up with an essay on fortress warfare; account of manœuvres at Orany; and military statistics of Japan, this last article, however, being chiefly on the commercial aspect of that country, but as it is to be continued, we may hope for the military statistics later on.

The September number contains a continuation of some of the articles in the preceding one, and an interesting paper on cavalry camps of exercise, in which the author throws out some very useful suggestions. On reading this article it becomes apparent how great are the disadvantages under which the training of the Russian army, and more especially of the cavalry is carried on, in consequence of the length and severity of the Russian winter.

The writer whilst lamenting the hurried manner in which cavalry instruction has to be gone through owing to lack of time, points out how a certain amount of this might be gained (1) by reducing the number and length of inspections, and (2) by utilizing the time spent in marching to the place appointed for the camp of exercise (annual event) in the following manner:—The marches should be carried out as though actually in the enemy's country, and the halts at night made with all the necessary precautions. A staff officer should accompany each regiment, who every day should give out some general idea to be worked out, and as the regiments converge on their destination regiments should manœuvre against each other. Special attention should be given to the training of scouts, and prizes and a badge awarded to those who distinguish themselves in the same way as to best shots in the infantry.

Another article is written in answer to one which appeared some numbers back advocating the removal of regimental workshops to a head-quarters' depôt on the grounds that a large number of men are taken away from their proper duties to serve as tailors, shoemakers, harness menders, &c. The present article shows the impracticability of such a scheme, and urges as the chief reason against adopting it the deleterious effect it would have on rapid mobilization.

Other subjects treated of in the number are regimental schools; new entrenching tool; the railway system in France; and the sound produced by projectiles travelling at a high velocity.

A. T. H. N.

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RECENT IDEAS ON FORTIFICATION.

BY MAJOR G. D. STAWELL, Devonshire Regiment.

The development of curved fire of artillery, the increase of shell power, the accuracy, penetrative effect, and range, both of artillery and rifle fire, the introduction of machine and quick-firing guns, and the proposed adoption of powerful explosives in the warfare of the future, have, it is generally admitted, altered the conditions under which fortification will be employed, and have rendered obsolete many of the ideas which find expression in the text books used in our army. The opinion has lately been expressed by Lord Wolseley that the whole question of fortifications will be completely revolutionized, and he considers that it is a very doubtful matter if most of the defences which have been erected within the last twenty years upon the continent of Europe have not been rendered as absolutely useless as if they had been built upon a quicksand, by the discovery of the great explosives which have been recently experimented upon in England as well as upon the continent.* The method by which the art of fortification may regain the importance which it has certainly, though perhaps only temporarily lost, constitutes a problem, the solving of which forms one of the most important questions of the day, and it is with a view to affording some assistance to officers who have not had the opportunity of studying the latest developments of the art which have appeared in the pages of "La Revue Militaire de l'Etranger," "L'Avenir Militaire," and other recent publications that the following pages have been written.

The Organization of Fortresses.

It has been urged by some authors that permanent fortifications should be completely abolished, and Major Scheibert † is of opinion that they will be replaced by a system of movable fortifications combined with steam power. This is doubtless an exaggerated view, but the organization of movable materials for fortification might be made applicable in the cases—1st, of great fortresses, which should possess in peace time a line of permanent works, whose intervals will have to be rapidly entrenched; 2nd, of fortified places made after the breaking out of hostilities; and 3rd, of strongly entrenched positions at special tactical points. The materials, consisting of guns with their ammunition, all requisites for the construction of blindages, metallic or otherwise, temporary counterscarp galleries, powder magazines, and temporary rail-roads and bridges would be stored in places whence they could be easily removed. As soon as the order for mobilization is given, the depôts will set this movable material in motion in the direction of the points indicated by the general line of march; and in this way it would be possible to take in hand at once the subsidiary defence of the permanent fortresses, the works of temporary fortification, which have been studied and decided upon in time of peace, and those which circumstances may render necessary. Any fortress which on account of its proximity to the frontier could be reached in 24 hours, should not contain any movable material intended for other places, but should, on the other hand, be provided with everything necessary for itself. By this means it is hoped that the employment of permanent fortification may be restricted to places of the first line, and to places of operation or great fortresses, whose numbers would be limited, but which would be rendered as strong as possible. For all other purposes, temporary fortifications, which, thanks to the movable materials provided, could be run up with great rapidity, would probably be sufficient. In the great fortresses, which are in a position to give support to an operating army, this material will be especially valuable for occupying the ground lying between the permanent forts or "points d'appui." It is suggested by some authors,* that in order to protect the whole of the guns employed, those intended for the artillery contest, instead of being placed in the intervals, should be mounted in the "points d'appui," or in batteries of a nearly similar nature. Most of the guns are placed in cupolas, which in large works occupy different positions according to the *rôle* assigned to them. The rest of the available space is utilized for infantry trenches or for light gun batteries. Overhead cover is provided as much as possible, both for guns and men. Every effort is made to keep the strength of the "points d'appui" up to a certain limit, beneath which it is considered they would become too weak for independence and for resistance to open assault.† The design for a fort on an elevated site intended to cover a great fortified place is furnished with a *réduit*. The armament is arranged as follows:—two great cupolas, each containing two guns of 15 *centimètres*, ‡ occupy the shoulder angles of the fort in front of the parapet: they are surrounded by earthen masks arranged against the slope, which allows of their firing as long as the enemy is at a distance, while they can be made to disappear when hostile batteries have succeeded in establishing themselves under cover, within sufficient distance to enable them to counter-batter the works. A third large cupola containing two 15 *centimètre* guns, is placed in the *réduit*, while four cupolas, (two of which are "eclipse"), each containing one gun of 12 *centimètres*, are placed upon the crest, leaving sufficient space between them for emplacements for quick-firing guns, and for infantry. Behind these intervals, upon the slope of the rampart, are placed four cupolas, each containing a howitzer of 21 *centimètres*. Nine "eclipse" cupolas, each containing two quick-firing guns of 57 *millimètres*, are arranged as follows:—three in the salient in front of the *pan-coupé*, one upon each flank, one at each salient of the gorge and two on the crest of the *réduit*. Two "eclipse" guns of the same kind are placed so as to enfilade the posterns which open into the ditch of the *réduit*, while one quick-firing gun is placed in the central bomb-proof of the front of the gorge, so as to command the postern and the ramp which leads into the ditch of the fort. Eight quick-firing guns upon non-recoiling wheeled carriages, and ten portable mortars of 12 *centimètres*, complete the armament of the work. Some large bomb-proofs, situated behind the *réduit*, in the gorge of the work, and under the ravelin at the entrance, protect men and materials, and communicate by galleries with the basements of the different cupolas, so that the guns which they contain can be served entirely under cover. A second type of fort differs from the preceding, only in the manner of flanking the ditches, which is effected by means of "eclipse" cupolas placed some above, and some under, the crest of the glacis. Works such as those above described, are of course only suitable for very large fortresses, and General Brialmont consequently proposes to abolish the *réduit*, and to throw the detached cupolas together. A fort of this kind differs much from the preceding, but General Brialmont considers that it would be strong enough to resist either a *coup-de-main* or a regularly organized attack, the only disadvantages being that the garrison will not be able to defend the breaches with the same facility, and that the front of the gorge will not be organized so as to render counter-attacks possible at the moment the enemy enters the fort. The armament under cupolas consists of five quick-firing guns of 57 *millimètres*, four guns of 12 *centimètres*, four guns of 15 *centimètres* grouped in pairs, and two 21 *centimètre* howitzers. The armament without bomb-proof cover consists of six quick-firing guns on wheeled carriages. The cupolas for the 15 *centimètre* guns, for the 21 *centimètre* howitzers and for two of the 12 *centimètre* guns form a central group resting on cemented betony.* The two other cupolas for the 12 *centimètre* guns are placed in the middle of the faces. The undoubted advantage of triangular works, viz.,—facility of flanking by means of counterscarp galleries, adaptability to ground, and relative smallness of the space occupied, has led General Brialmont to study forts of this character. In one of the proposed types the cupolas are separate, in the other they are all, with the exception of those for quick-firing guns, placed together on a central mass of betony. The latter plan gives better protection to the rings of betony which protect the base of the glacis plates, but offers a larger target to the enemy's direct and plunging fire; but General Brialmont considers that no great evil will ensue if the cupolas can resist a prolonged fire of guns, howitzers, and mortars.* In other respects these triangular forts are organized in the same manner as the other works proposed by the eminent Belgian engineer, the principal conditions being artillery under cupolas, in sufficient numbers, employed to fire either upon the ground in front or upon the intervals, a quick-firing artillery, and banquettes for infantry, as much developed as possible, and shelters for men and material, placed in the gorge of the works, and strengthened with great care. Intermediate permanent batteries are organized in nearly the same manner, the guns being placed under cupolas and protected similarly to those in large forts.

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* "Royal United Service Institution Journal."—Vol. 33, page 38.
† "Revue Militaire de l'Etranger."—Vol. 34, page 722.

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* "Revue Militaire de l'Etranger."—Vol. 34, page 544.

† Brialmont, "Influence du tir plongeant et des obus-torpilles sur la fortification."

‡ *Centimètre* = 0·3937 inches. *Millimètre* = 0·0394 inches.

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* **A composition similar to, but more durable than, Portland cement.**

Neither forts nor batteries will then be used only as "points d'appui," their guns must take a large share in the artillery contest. General Brialmont has great confidence in turrets as a protection to the guns from fire, and as a means of augmenting the powers of resistance of works and their means of action against attacks made in force. The result, however, is not yet complete, since it will be necessary to have some guns in the intervals, principally upon the fronts liable to attack; moreover, the advocates of the simple "points d' appui" object, as will be seen hereafter, to the idea of making the forts take part in the artillery contest, because it is dangerous to them, and in any case useless, since this contest will principally take place on ground situated beyond the permanent works. The value of a series of detached works forming a line with intervals round a central position has not been admitted by all those who have treated of the defence of fortresses. The fear of the intervals being forced by an enterprising enemy has led to the proposal of having a continuous line between the works, either of trenches or of obstacles, the forts being only used as magazines or *réduits*.

Thus Major Scheibert,† defends the sole use of the covered ways and of the trenches which connect them; to which he attaches great value. The organization of covered ways is doubtless very important, but without "points d' appui" the long lines thus formed, weak throughout their length, difficult to watch, and provided only with frontal fire, could not secure their defenders from a vigorous assault. They cannot be thrown up in peace time, and large garrisons would be confined in them; whose offensive movements they would hinder. A similar solution has been proposed by Colonel Biancardi ‡ whose idea is to strengthen the great modern fortresses by employing long thin lines of fortification, which would have nothing to fear from bombardment. They would be covered by accessory defences, and would be defended by infantry fire, and by quick-firing guns, which would be placed in turrets. The real works would form a *réduit*, and would be hidden from view, as would be also the batteries for curved fire, which would be further in rear. The trenches would be disposed so as to command the ground in front, and from their low relief would scarcely be seen by the enemy. They would have no regular flanking defence, but the accessory defences would be placed sufficiently far in the front to delay the enemy's advance so that no attack in force would have a chance of success. The extreme dissemination of the means of action which the adoption of the preceding systems would inevitably entail, does not appear to be favourable to an efficient defence, it has therefore been suggested to join the works, so as to form groups capable of putting a large number of guns into line,* the object being to enable the defence to bring superior forces to bear upon important tactical points and to maintain them during the whole contest, and to render a prolonged defence possible, without entailing the construction of a number of temporary works. The central position would be fortified and surrounded by a line of groups of works, each group being about 8,000 *mètres* distant from the enceinte. For a fortress having a radius of 12 *kilomètres* † there would be about five such groups with intervals of from 14 to 15 *kilomètres* between each group. Each group would consist of a certain number of small batteries, arranged in two lines on the exterior, and in one line on the interior side. The total armament of the group would be 360 pieces of ordnance, of which 232 would be guns. The author considers that under these conditions, and with the protection of cupolas, the struggle could be advantageously maintained "against a modern siege park, which contains about 400 pieces of ordnance." The defence of the large intervals caused by this arrangement of the works would be based upon the combined action of the central position, the nearest groups of works, and the active defence. This grouping of works has by no means all the advantages which are claimed for it. It could not without the assistance of a large garrison, insure by itself the safety of a fortified place; but it would possess a real value in the case of the organization of a particularly important position in the first line of defence of a fortress, provided that all the works should not be organized as regular "points d' appui." In his work "La défense des Etats et les camps retranchés," General Brialmont remarks that he has, in "L' Etude sur la fortification des capitales," proposed to fortify the great centres by means of a small number of groups of works, each of which should comprise some "points d' appui," some intermediate batteries, and some emplacements for guns of position and light pieces. This organization, which shelters the various groups from attacks in force whilst permitting the development of a powerful artillery, necessitates more works than a place surrounded by a girdle of forts, and consequently a considerable increase of expense. This solution, therefore, would only be suitable for very large fortresses; and then only in the case of special points or of very extended places, not provided with a permanent enceinte. It is evident then, that neither the [illegible] lines of groups of batteries, can constitute alone the first line [illegible] intermediate points of support are indispensable. These should not be built more than four [illegible] *metres* from each other, and thus their attacks in force will be easily repulsed by the works on the flanks, and the necessity of a large number of guns will be avoided [illegible] narrow intervals, and whereas to place as many guns as possible under turrets, would have [illegible] *metres* distant from each other; which would be a most expensive arrangement, and would tend to impede the free movement of the army. It would be preferable to have a line of points of support [illegible] nearer together, the pieces of ordnance intended for the artillery struggle being placed between them. Emplacements for the latter should be made in time of peace, or else, [illegible] materials for constructing the foundations should be provided. In this way it is expected that a double result will be attained; viz., to secure the place against the attack in force of the field troops, when the enemy first appear before it, and as soon as the investment is completed, to [illegible] all the means of defence [illegible] prolonging the siege. General von Sauer of the Bavarian Artillery recommends* an entirely different system of defence. He is of opinion that the forts of the first line should be drawn nearer together than has hitherto been the case; and that they should be reduced in size, so as to require smaller garrisons, and also so as to be more easily concealed from the enemy's guns; in addition to which they should be protected from vertical fire by means of turrets, which should be independent of the works. Each fort would thus consist of a single cupola surmounted by a sort of low turret. These small works form the first line of defence, and would be arranged in a single rank at intervals of 1,000 to 1,200 metres. The disposition and intervals between these forts might vary according to the position, and the vulnerability of the sectors they are intended to cover. General von Sauer considers that the increase in their number would not present serious difficulties, on account of their small size; and he estimates the necessary garrison at 20 men.

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* Brialmont, "Influence du tir plongeant et des obus-torpilles sur la fortification."

† "Die Befestigungs Kunst."

‡ "Le fortezze e l' assiedo. Rivista di artiglieria e genio." 1887.

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* "Sull ordinamento dei campi trincerati. Rivista di artiglieria e genio." 1887.

† A *mètre* = 39·37079 inches, 8 *kilomètres* = 5 miles.

The cupolas should be armed with quick-firing guns only, and should form an impassable barrier, behind which are placed the heavy guns intended to maintain the artillery duel. Assuming an average length of 60 *kilometres* for the first line of defence, and supposing the towers distributed uniformly in two ranks, at 1,000 *metres* apart: a total of 120 towers is reached, with a garrison of 2,400 men. With intervals of 200 *metres*, a double rank of towers, and garrisons of 12 men for each work, the total strength of the first line would be 7,200 men, a number still weak in comparison with those employed at present. It is, however, argued that these forts can only be compared to advanced posts, in so far as they are points of observation; where, from a fighting point of view, the comparison ceases, because advanced posts are supplied with constantly increasing reserves, whereas nothing of the kind exists in the system of fortification just described. In case of a combined attack on a number of forts at the same time, the garrisons would not be able to mutually support each other. The weak spot in the system appears to be the want of "points d' appui", and it is difficult to imagine that they can be absolutely dispensed with. This view is borne out by the efforts made on all sides to give to "points d' appui" their maximum value, so as to counteract the offensive tactics lately recommended, which we will consider further on, namely, to demoralize the defenders by vertical fire, and then to push on to the assault. The weaker the works of the first line, the greater will be the chance of success of such a system; but with good "points d' appui" not only will the possession of certain important positions be assured, but the defence of the intervals can be strengthened by powerful flanking fire. It also appears doubtful whether the system of lines of cupolas would not entail greater expense than that of "points d' appui." The promoters of the system urge that this would not be the case, taking Major Schumann's estimate of 125,000 francs for a two gun turret; but this estimate is probably too small.

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* "Tactische under suchungen uber neue Formen der Befestigungs Kunst." No. 721, page 739.

General Brialmont puts it at double, which would raise the expense of the 100 to 120 towers intended to replace the girdle of detached forts, from 10 or 12 million to 20 or 25 million francs.

The same objection is taken to the smaller towers containing a garrison of 12 men. General Brialmont considers the estimate of 25,000 francs as far too low for each work, putting it, with all its accessories, at 80,000 francs which would raise the cost of a fortified position of 60 *kilomètres* in extent, from 15 million to 48 million francs. It is generally, therefore, considered advisable to employ "points d' appui" containing infantry, and usually a very limited number of guns intended principally to assist in the defences of the intervals[*], as it is recognized that artillery in the open could not live on the ramparts; but it is considered all important that the guns intended to bring a flanking fire on the assailants should be placed in positions of almost absolute security, which as the enemy is sure to attack them with all the means at his disposal, it is proposed to obtain, partly by placing obstacles, and partly by the use of armour plating and by defilading, which would be effected by means of the flanks of the works and the ravelins of the gorge, which furnish positions in which the guns can be defiladed and at the same time they command a view of the intervals. As, in consequence of the continual progress of artillery, the expense and difficulty of organizing and defending works is constantly increasing, it is considered necessary to reduce as far as possible the number of guns inside the works, and the amount of cover thrown up for the men and the armament. It is of course desirable that all the guns should be completely covered, but it does not seem either possible or advantageous to place them all either in "points d'appui" or in intermediate batteries similarly organized. Lieut.-Colonel Voorduin advocates that the guns of position should be divided into two unequal groups, of which the smaller, intended for the defence of the intervals and the neighbouring works, should be placed inside the latter, and covered by fixed or movable iron shields and by earthen screens, from which they can be withdrawn by special arrangements. The second group of guns would be placed in batteries outside the works, and from motives of economy would have no overhead cover, but would be concealed from the view of the enemy. It is questionable, however, whether the first group had not better be divided into two distinct sets, one for firing on the ground in front, and one for flanking the intervals. The guns intended to engage the batteries which the enemy would first place in position, and which would not contain any guns of heavy calibre, should be able to bring direct fire to bear with rapidity; and as by the time they would be overpowered by the enemy's heavy guns the defence of the intervals would be organized, it seems neither necessary nor practicable to place them behind covering screens. But though iron shields may suffice for the guns firing upon the ground in front, earthen screens must be used for those which are to defend the intervals. These should be defiladed as far as possible, in which case a much slighter structure might suffice, as from recent experiments it would appear that plunging fire is only efficacious if the striking points can be corrected by observations. In the "Duncan Gold Medal Prize Essay" for 1889, Captain Stone points out that "in future sieges the most difficult and responsible, as well as the most valuable work, will consist in the correct observation of the effects of fire, and the intelligent transmission of these observations to the batteries concerned."* It is, however, evident that the value of such dispositions will be increased, if the covering mass presents a considerable amount of resistance; and it has been proposed that these guns should be placed in the gorge of the works, where they would be sheltered as by a ravelin, and from whence they could fire upon the intervals. As to the defence of the works themselves, reliance is almost universally placed, partly upon the infantry garrison, and partly upon quick-firing guns and mitrailleuses, which can either be withdrawn under neighbouring casemates or protected by "eclipse" or revolving cupolas, as has already been described. With the assistance of passive defences (ditches, obstacles, mines, &c.,) it is believed that they can be made impregnable as long as the ammunition lasts. This arrangement, to a great extent, agrees with the method which is likely to be adopted in our service, as in the Manual of Siege Artillery it is stated † "an active defender will for the future use the forts chiefly as a line of keeps and observatories in a great defensive position, the forts themselves only mounting such guns as can be thoroughly well covered; while a number of these guns, as well as a proportion of the artillery from works not engaged, will be posted in siege batteries between or just in rear of the line of forts, and connected with them by trenches: in rear of these trenches fresh batteries can be made, into which to shift any guns that may be too hardly pressed by the attack." It is certain that the "points d' appui" on the fronts exposed to attack would not be able, with the small number of guns that they could bring into action, to sustain the artillery duel; and it follows that now more than ever, all the armament which would be useless elsewhere, should be concentrated on the fronts attacked. It should be utilized on the same principles as those recognized in the attack, viz, the targets presented to the enemy should be as small and as little observable as possible. It will be necessary either to construct temporary batteries, well defiladed, between the "points d' appui," or to make arrangements for bringing up the greatest possible number of guns to the points required.[*]

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[*] On the other hand, the principle of placing infantry in works where there are guns is strongly condemned by several eminent authors. General Pierron in "Les Methodes de Guerre actuelles", 1889, page 614, quotes a German artillery officer to the following effect. "To place artillery in detached forts is to thoroughly expose it to the concentric fire of the besieger's batteries and to have it rapidly crushed; the fort becomes a heap of ruins and its garrison lies buried under the rubbish. By the defender of a place the fort should be regarded as merely a point of support covering the line of artillery emplacements. He will therefore provide only infantry as a garrison which will guard the magazines that the fort should be designed to contain. The guns of the defence will be disposed in the intervals between, but somewhat behind the forts, and will, like the guns of the attack, take advantage of the undulations of the soil."

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* "Proceedings Royal Artillery Institution," 1889, Vol. 16, page 161.

† "Manual of Siege Artillery," page 14.

If the works attacked, form part of the exterior line of a great fortress, their intervals can frequently be used by the defenders to run up batteries or to bring up guns unexpectedly. The defenders, like the assailants, can act by surprise, and the transport of heavy guns from the fortress to the line of detached forts would certainly not present more difficulties than the attack has to contend against in establishing its batteries. Such will be, from an artillery point of view, the best way of conducting the active defence of the fortress. It consists of attacking the assailant with the fire of batteries temporarily established, even during the siege, in the intervals between the forts, which at the same time should offer as vigorous a resistance as possible.[†] In order to form an exact idea of the conditions of the defence, powers and means of action should not be attributed to the attack which are systematically denied to the defence.[‡] Curved fire and the new explosives can be employed as well on the one side as the other, and it can easily be imagined that the defence may bring up to the threatened points as many guns, and make as efficient use of them, as the attack. There is no necessity to seek by an exaggerated use of guns under cupolas, or behind armour plates, for results which may easily be obtained by the adoption of methods similar to those employed in the attack.[||] It may be urged that improvised batteries or gun emplacements would be exposed to open attacks in force, but the assailant is under less favourable conditions, thanks to the protection of the "points d' appui." The object to be aimed at, with regard to the exposed front, is then, to make arrangements for bringing up the greatest possible number of pieces, for establishing them in defiladed positions, for furnishing them with ample supplies of ammunition, and for securing them against attacks in front. Several authors also advocate that the guns should be capable of being moved, which would diminish the chance of their being struck by the enemy's projectiles. In order that the artillery of the defence may be assured of a certain superiority over that of the attack, a considerable number of pieces must be brought into action in the intervals between the forts, corresponding to the points of attack. Major Scheibert allows 50 or 60 guns per interval, and as it is estimated that the zone corresponding to a point of attack will comprise about six fronts, from 300 to 360 pieces of ordnance would be required. General Brialmont* allows 240 pieces for the temporary batteries to be constructed in the intervals of the forts attacked, but he shows that this armament can and ought to be considerably increased, as soon as the attack has clearly developed itself. In the intervals of 3,000 *mètres* between the "points d'appui," 120 pieces could easily be placed in action, independently of those contained in the permanent works and the supporting batteries, which would give 360 for the three fronts attacked. With intervals of 4,000 *mètres*, each of them would contain 140 pieces, and the whole number corresponding to the three fronts would be 420.

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[*] "Le forme ed i materiali della nuova fortificazione, par le Capitanie du génie Enrico Rocchi.—Rivista di artiglieria e genio". March 1888.

[†] "Ideen über Befestigungen."

[‡] "Ancora il ferro nella fortificazione, par le Major Lo Forte. Revista di artiglieria e genio." 1888.

[||] "Revue Militaire de l' Etranger," Vol. 34. page 729.

The preceding calculations should apparently be considered as giving the outside limits, but they afford an idea of the number of pieces of ordnance required for the intervals. In order to facilitate the work of armament and ensure the supply of ammunition, &c., a good network of communications is required, connecting the permanent works, the magazines of sectors, and the central main work, with the temporary batteries or the probable artillery emplacements. It would be still better if the principal of these lines of communication were provided with rails. It is estimated that from 150 to 200 rounds should be provided for each piece beforehand, and that the consumption in 24 hours will be 80 rounds for medium, 60 for heavy guns, and 40 for mortars. This would necessitate for the artillery of the intervals only on the fronts attacked, a previous supply of 80,000 rounds and a daily consumption of 24,000 rounds, in addition to which, transport will be required for the materials of all kinds, so that some idea can be formed of the enormous amount of carriage which is necessary in order to keep up the artillery contest. Every effort should be made to diminish the length of the communications as much as possible, by distributing the magazines. The defiladed emplacements should be selected in rear of the general line of batteries, principally upon the reverse side of the slopes which surround the place. The railway intended to insure the armament and supply of the artillery of the intervals will, for a part of its course, follow a line not far from that of the batteries.

It has also been proposed by Commandant Mougin and other writers to use this railway for the transport of pieces of ordnance mounted on "eclipse" carriages; this would allow of the rapid disposal of strong movable batteries, which might replace the stationary ones whose construction could not often be undertaken until after the enemy's dispositions had been noted.[*] It can, however, scarcely be admitted that a railway of this kind could be established in peace time throughout the whole length of the first line of defence, but its construction as well as that of the batteries of the intervals, would probably be limited to the most exposed fronts. But though it might be necessary, on some parts of the first line of defence, to await the disclosure of the enemy's intentions before making a railway, this railway, when once constructed, would have the advantage of insuring the mobility of the guns and consequently of considerably diminishing the chances of their being struck. It is usually proposed to mask the railway with an earthen embankment, the top of which would be covered either with branches or with light plantations, but this epaulement would only be necessary for those parts of the trace which could not be defiladed by taking advantage of the features of the ground and natural cover. Some authors, however, advocate a continuous line of parapet, with a view of securing a good line of defence, capable, with the assistance of the "points d' appui," of insuring the safety of the intervals.

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* "La fortification du temps présent."

It is proposed to make infantry banquettes here and there along the embankment, and in case of need, emplacements for turrets, intended to contain quick-firing guns and mitrailleuses. The necessity would thus be avoided of constructing intermediate works for infantry between the forts, whenever their distance apart is too great, or the conformation of the ground does not permit of their sufficiently commanding the intervals. The trace of the epaulement will not, however, always allow of the formation of a good fighting line, and under these circumstances it will be difficult to utilize it with advantage; also, whenever possible an attempt would be made to do without it altogether. The parapet running along the railway, must then be considered more in the light of cover than in that of a fighting line: consequently, whether temporary fixed batteries or movable batteries on rails be adopted, the intervals should, for their own security, be placed in a state of defence by utilizing natural objects or by throwing up small intermediate works.[†] The organization of the first line of defence should be completed by the formation of good points of observation, as it is indispensable to make out the besiegers' positions as soon as possible, and to expose them to the chance fire of projectiles sufficiently powerful to do them serious damage. The choice of suitable points would be made, and the observers instructed in their special duties, beforehand.

Thus, every step would be taken to ensure, not only the power, but the quality of the fire of the defending artillery. It may be hoped also to take the initiative against the enemy, and so to delay him in completing his armament preparatory to opening fire. With intervals so prepared, the defenders will be in a position not only to keep up the

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[*] "Le forme ed i materiali della nuova fortificazione.—Ancora il ferro nella fortificazione. Rivista di artiglieria e genio." 1887—1888.

[†] See Brackenbury's "Field works," pages 133—136, for description of latest type of British redoubt for infantry; also Plate VIII, Vol. 17, "Proceedings Royal Artillery Institution."—August 1889. Copied in Appendix.

NOTICES OF FOREIGN CONTEMPORARIES.

Revue Militaire Belge, (quarterly) Vol. II.

This journal contains a description of a new military hospital, constructed at Brussels not long ago at a cost of 2,700,000 fr. It is capable of accommodating 330 sick, each bed thus costing 8,333 fr. A comparative list of the cost per bed of some of the principal hospitals in Europe is then given. The Hôtel-Dieu de Paris heads the list, the cost per bed being 30,375 fr., St. Thomas's, London, coming next with 19,425 fr. The principal fault which the visitor found was that the regulation of the ventilation was left in the hands of the patients; otherwise the arrangements were good.

Next appears an article on arms of modern warfare, which goes very closely into the details of the mode of action of various explosives.

The remainder of the journal is taken up with a long history of the Balkan peninsula, which the author regards as the theatre in which the drama of the eastern question will be played out. The history commences from the earliest times of Constantinople and is carried up to the present date. It describes the development of events, the gradual dismemberment of the Ottoman empire, the defences of Constantinople and the Russo-Turkish campaign. All the best authorities have been consulted on the subject, and the result is an exceeding interesting essay. The article, which is anonymous, is to be continued.

Revue Militaire de l' Etranger, (fortnightly) August and September.

Part I opens with an article on the subject of operations by night. It is somewhat remarkable how much attention is being directed to this branch of military science in foreign armies, and not only theoretically, for night operations form a part of the programme at most camps of exercise and autumn manœuvres. The article begins by dealing with the subject of night-marches, and gives as instances of the successful accomplishments of the same, the retreat of the 13th French Army Corps after Sedan, and also the defeat of the Federal Army before Chancellorsville by the skilful movement executed by General Lee, commanding the Southerners. Whilst admitting the tremendous advantage of a successful night manœuvre, the writer points out the extreme riskiness of such movements and the principal difficulties to be overcome. The opinions of various foreign authorities are then quoted as to the best means of training troops to accomplish night marches successfully.

Part II deals with the question of picquets and sentries by night, and from numerous examples the author points out the absolute necessity for specially training the men by night for these duties. This is a point on which our army might with advantage take a hint.

Amongst other articles which are of minor interest appears one on the subject of the English army. Unfortunately it is taken up more with details, than general criticism. As regards conscription the writer considers that the English as a nation are far too conservative to adopt the continental system, and without it he is of opinion that our army cannot be of any practical value as compared with that of other European powers. To quote his own words "c'est ni l'armée d' Alexandre, ni la nation armée."

A striking example of our conservatism the author sees in our *feu-de-joie*, which he traces back to 1654. This ceremony appears to him, and with justice, peculiarly antiquated and ridiculous, and indeed it is difficult to perceive why the explosion of so much gunpowder should be considered an appropriate way of expressing one's loyalty on the Queen's birth-day.

The marked difference between our paper strength and our actual strength does not escape his notice. With reference to the mounted infantry he does not think that the advantages have been decisively demonstrated, and points out the difficulties of properly adjusting the cavalry and infantry side of the question.

There is also a full account of regimental transport trains in the Russian army. It appears that they did not find their former system answer in the campaign of 1877-8, and so a special commission was appointed which continued its labours till 1885, the result being the present system described. Roughly speaking the train consists of 43 one-horse wagons, 39 two-horse, and four "lineikas" drawn by four horses; the two former are for the carriage of ammunition, medical stores, provisions, officers baggage, &c., and the latter for the conveyance of sick and wounded The *personnel* amounts to one officer and 103 men.

Under the heading of "Military News" is given a short account of the Military Field Sport Society in the Russian army. In October 1886 an order was published laying down that a certain number of men in each regiment, chosen for their resolute characters and robust constitutions, should be specially detailed for the pursuit of field sports of all kinds with the object of training them to become good scouts and judges of distance and locality. Now this system is to be carried still further and a similar society is to be formed both to develope the same qualities amongst the officers, and to afford the opportunity of indulging in sport under the most economical conditions. There will be a committee of management to organize *shikar* parties, and a general meeting will be held every year to settle questions of close time, frame new rules, &c.

It will be most interesting to obtain further information as to how the scheme works. Happily our officers are imbued with sufficient love for field sports not to require much urging in this direction, but there are many who are deterred from indulging in it, as much as they might, by the expense, difficulty of making up parties, and obtaining permission to shoot in many well known jungles, &c. Would it be altogether impossible to organize some society of the same sort with us, not only for *shikar* but exploration? To the latter object Government might lend a helping hand. As matters now stand cold water is generally thrown on all attempts of officers to penetrate to little known districts as for instance Thibet, Kafiristan, the country on our North-West Frontier, &c.

The Russians in this respect are far ahead of us, and expeditions are constantly being sent to parts of Central Asia, to say nothing of private ventures.

Revue du Cercle Militaire, September.

No less than five numbers of this Journal make their appearance in this month. The number of articles is far too great to give even a brief description of each, but noticeable amongst them are the following:—composition of a *corps d'armée*; transport, the development of the torpedo; mountain batteries; restoration of the memorials at Sebastopol in honor of the French, who perished in the Crimean War; and a description, with plates, of M. Contelle's apparatus for manufacturing hydrogen for balloons, which was shewn at the Paris Exhibition.

Writing on the subject of the visit of the German Emperor to England a correspondent exhibits a natural reluctance to attach the same importance to it that the Germans do. He discusses the merits of the German fleet, and finds that their ships were more clumsy in construction, but that their men though somewhat young in appearance were very smart, especially their marines, and the general strength of their crews much greater than in the British ships.

Further on he prophesies the ruin of the Krupp firm in consequence of the invention of smokeless powder and the necessary abandonment of steel in the manufacture of guns.

Ornithologists and lovers of nature will read with regret of the intention of the Prussian Minister of War to take measures for the destruction of all birds of prey, the buzzard alone excepted. The object of this measure is to ensure the safety of military carrier pigeons in the event of war. What arrangements will be made to prevent the arrival of migratory birds of prey has not yet been divulged.

Voyenni Sbornik.]

The August number commences with a description of the passage of General Skobeleff's detachment across the Balkans, and the fight at Shinova, (continued from a former number), and a history of the Krasnovodsk garrison from the time of it first being formed.

In an article on the cavalry question, the writer begins by stating that the cavalry soldier above all others should be distinguished by all the good qualities which go to make up a man, and than gives his reasons. The corporal frame which is to contain all these superlative excellencies, however, in his opinion, should not exceed 5 ft. 7 in. and may be as low as 5 ft. 5½ in. He dwells on the importance of the fact that a few bad riders in a squadron impair the efficiency of the whole to point out the absolute necessity of having maneges, so that equitation may be practised in winter as well as in summer.

Another article on the subject of instruction in riding for the cavalry, somewhat in a similar strain, leads us to suppose that the seat of the Russian cavalryman leaves something to be desired. Surely this cannot refer to the Cossacks, of whom we hear so much!

The remainder of the journal is taken up with an essay on fortress warfare; account of manœuvres at Orany; and military statistics of Japan, this last article, however, being chiefly on the commercial aspect of that country, but as it is to be continued, we may hope for the military statistics later on.

The September number contains a continuation of some of the articles in the preceding one, and an interesting paper on cavalry camps of exercise, in which the author throws out some very useful suggestions. On reading this article it becomes apparent how great are the disadvantages under which the training of the Russian army, and more especially of the cavalry is carried on, in consequence of the length and severity of the Russian winter.

The writer whilst lamenting the hurried manner in which cavalry instruction has to be gone through owing to lack of time, points out how a certain amount of this might be gained (1) by reducing the number and length of inspections, and (2) by utilizing the time spent in marching to the place appointed for the camp of exercise (annual event) in the following manner:—The marches should be carried out as though actually in the enemy's country, and the halts at night made with all the necessary precautions. A staff officer should accompany each regiment, who every day should give out some general idea to be worked out, and as the regiments converge on their destination regiments should manœuvre against each other. Special attention should be given to the training of scouts, and prizes and a badge awarded to those who distinguish themselves in the same way as to best shots in the infantry.

Another article is written in answer to one which appeared some numbers back advocating the removal of regimental workshops to a head-quarters' depôt on the grounds that a large number of men are taken away from their proper duties to serve as tailors, shoemakers, harness menders, &c. The present article shows the impracticability of such a scheme, and urges as the chief reason against adopting it the deleterious effect it would have on rapid mobilization.

Other subjects treated of in the number are regimental schools; new entrenching tool; the railway system in France; and the sound produced by projectiles travelling at a high velocity.

A. T. H. N.

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RECENT IDEAS ON FORTIFICATION.

By Major G. D. Stawell, Devonshire Regiment.

The development of curved fire of artillery, the increase of shell power, the accuracy, penetrative effect, and range, both of artillery and rifle fire, the introduction of machine and quick-firing guns, and the proposed adoption of powerful explosives in the warfare of the future, have, it is generally admitted, altered the conditions under which fortification will be employed, and have rendered obsolete many of the ideas which find expression in the text books used in our army. The opinion has lately been expressed by Lord Wolseley that the whole question of fortifications will be completely revolutionized, and he considers that it is a very doubtful matter if most of the defences which have been erected within the last twenty years upon the continent of Europe have not been rendered as absolutely useless as if they had been built upon a quicksand, by the discovery of the great explosives which have been recently experimented upon in England as well as upon the continent.* The method by which the art of fortification may regain the importance which it has certainly, though perhaps only temporarily lost, constitutes a problem, the solving of which forms one of the most important questions of the day, and it is with a view to affording some assistance to officers who have not had the opportunity of studying the latest developments of the art which have appeared in the pages of "La Revue Militaire de l'Etranger," "L'Avenir Militaire," and other recent publications that the following pages have been written.

The Organization of Fortresses.

It has been urged by some authors that permanent fortifications should be completely abolished, and Major Scheibert † is of opinion that they will be replaced by a system of movable fortifications combined with steam power. This is doubtless an exaggerated view, but the organization of movable materials for fortification might be made applicable in the cases—1st, of great fortresses, which should possess in peace time a line of permanent works, whose intervals will have to be rapidly entrenched; 2nd, of fortified places made after the breaking out of hostilities; and 3rd, of strongly entrenched positions at special tactical points. The materials, consisting of guns with their ammunition, all requisites for the construction of blindages, metallic or otherwise, temporary counterscarp galleries, powder magazines, and temporary rail-roads and bridges would be stored in places whence they could be easily removed. As soon as the order for mobilization is given, the depôts will set this movable material in motion in the direction of the points indicated by the general line of march; and in this way it would be possible to take in hand at once the subsidiary defence of the permanent fortresses, the works of temporary fortification, which have been studied and decided upon in time of peace, and those which circumstances may render necessary. Any fortress which on account of its proximity to the frontier could be reached in 24 hours, should not contain any movable material intended for other places, but should, on the other hand, be provided with everything necessary for itself. By this means it is hoped that the employment of permanent fortification may be restricted to places of the first line, and to places of operation or great fortresses, whose numbers would be limited, but which would be rendered as strong as possible. For all other purposes, temporary fortifications, which, thanks to the movable materials provided, could be run up with great rapidity, would probably be sufficient. In the great fortresses, which are in a position to give support to an operating army, this material will be especially valuable for occupying the ground lying between the permanent forts or "points d'appui." It is suggested by some authors,* that in order to protect the whole of the guns employed, those intended for the artillery contest, instead of being placed in the intervals, should be mounted in the "points d'appui," or in batteries of a nearly similar nature. Most of the guns are placed in cupolas, which in large works occupy different positions according to the *rôle* assigned to them. The rest of the available space is utilized for infantry trenches or for light gun batteries. Overhead cover is provided as much as possible, both for guns and men. Every effort is made to keep the strength of the "points d'appui" up to a certain limit, beneath which it is considered they would become too weak for independence and for resistance to open assault.† The design for a fort on an elevated site intended to cover a great fortified place is furnished with a *réduit*. The armament is arranged as follows:—two great cupolas, each containing two guns of 15 *centimètres*, ‡ occupy the shoulder angles of the fort in front of the parapet: they are surrounded by earthen masks arranged against the slope, which allows of their firing as long as the enemy is at a distance, while they can be made to disappear when hostile batteries have succeeded in establishing themselves under cover, within sufficient distance to enable them to counter-batter the works. A third large cupola containing two 15 *centimètre* guns, is placed in the *réduit*, while four cupolas, (two of which are "eclipse"), each containing one gun of 12 *centimètres*, are placed upon the crest, leaving sufficient space between them for emplacements for quick-firing guns, and for infantry. Behind these intervals, upon the slope of the rampart, are placed four cupolas, each containing a howitzer of 21 *centimètres*. Nine "eclipse" cupolas, each containing two quick-firing guns of 57 *millimètres*, are arranged as follows:—three in the salient in front of the *pan-coupé*, one upon each flank, one at each salient of the gorge and two on the crest of the *réduit*. Two "eclipse" guns of the same kind are placed so as to enfilade the posterns which open into the ditch of the *réduit*, while one quick-firing gun is placed in the central bomb-proof of the front of the gorge, so as to command the postern and the ramp which leads into the ditch of the fort. Eight quick-firing guns upon non-recoiling wheeled carriages, and ten portable mortars of 12 *centimètres*, complete the armament of the work. Some large bomb-proofs, situated behind the *réduit*, in the gorge of the work, and under the ravelin at the entrance, protect men and materials, and communicate by galleries with the basements of the different cupolas, so that the guns which they contain can be served entirely under cover. A second type of fort differs from the preceding, only in the manner of flanking the ditches, which is effected by means of "eclipse" cupolas placed some above, and some under, the crest of the glacis. Works such as those above described, are of course only suitable for very large fortresses, and General Brialmont consequently proposes to abolish the *réduit*, and to throw the detached cupolas together. A fort of this kind differs much from the preceding, but General Brialmont considers that it would be strong enough to resist either a *coup-de-main* or a regularly organized attack, the only disadvantages being that the garrison will not be able to defend the breaches with the same facility, and that the front of the gorge will not be organized so as to render counter-attacks possible at the moment the enemy enters the fort. The armament under cupolas consists of five quick-firing guns of 57 *millimètres*, four guns of 12 *centimètres*, four guns of 15 *centimètres* grouped in pairs, and two 21 *centimètre* howitzers. The armament without bomb-proof cover consists of six quick-firing guns on wheeled carriages. The cupolas for the 15 *centimètre* guns, for the 21 *centimètre* howitzers and for two of the 12 *centimètre* guns form a central group resting on cemented betony.* The two other cupolas for the 12 *centimètre* guns are placed in the middle of the faces. The undoubted advantage of triangular works, viz.,—facility of flanking by means of counterscarp galleries, adaptability to ground, and relative smallness of the space occupied, has led General Brialmont to study forts of this character. In one of the proposed types the cupolas are separate, in the other they are all, with the exception of those for quick-firing guns, placed together on a central mass of betony. The latter plan gives better protection to the rings of betony which protect the base of the glacis plates, but offers a larger target to the enemy's direct and plunging fire; but General Brialmont considers that no great evil will ensue if the cupolas can resist a prolonged fire of guns, howitzers, and mortars.* In other respects these triangular forts are organized in the same manner as the other works proposed by the eminent Belgian engineer, the principal conditions being artillery under cupolas, in sufficient numbers, employed to fire either upon the ground in front or upon the intervals, a quick-firing artillery, and banquettes for infantry, as much developed as possible, and shelters for men and material, placed in the gorge of the works, and strengthened with great care. Intermediate permanent batteries are organized in nearly the same manner, the guns being placed under cupolas and protected similarly to those in large forts.

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* "Royal United Service Institution Journal."—Vol. 33, page 38.

† "Revue Militaire de l'Etranger."—Vol. 34, page 722.

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* "Revue Militaire de l'Etranger."—Vol. 34, page 544.

† Brialmont, "Influence du tir plongeant et des obus-torpilles sur la fortification."

‡ *Centimètre* = 0·3937 inches. *Millimètre* = 0·0394 inches.

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* A composition similar to, but more durable than, Portland cement.

Neither forts nor batteries will then be used only as "points d'appui," their guns must take a large share in the artillery contest. General Brialmont has great confidence in turrets as a protection to the guns from fire, and as a means of augmenting the powers of resistance of works and their means of action against attacks made in force. The result, however, is not yet complete, since it will be necessary to have some guns in the intervals, principally upon the fronts liable to attack; moreover, the advocates of the simple "points d' appui" object, as will be seen hereafter, to the idea of making the forts take part in the artillery contest, because it is dangerous to them, and in any case useless, since this contest will principally take place on ground situated beyond the permanent works. The value of a series of detached works forming a line with intervals round a central position has not been admitted by all those who have treated of the defence of fortresses. The fear of the intervals being forced by an enterprising enemy has led to the proposal of having a continuous line between the works, either of trenches or of obstacles, the forts being only used as magazines or *réduits*.

Thus Major Scheibert,† defends the sole use of the covered ways and of the trenches which connect them; to which he attaches great value. The organization of covered ways is doubtless very important, but without "points d' appui" the long lines thus formed, weak throughout their length, difficult to watch, and provided only with frontal fire, could not secure their defenders from a vigorous assault. They cannot be thrown up in peace time, and large garrisons would be confined in them; whose offensive movements they would hinder. A similar solution has been proposed by Colonel Biancardi ‡ whose idea is to strengthen the great modern fortresses by employing long thin lines of fortification, which would have nothing to fear from bombardment. They would be covered by accessory defences, and would be defended by infantry fire, and by quick-firing guns, which would be placed in turrets. The real works would form a *réduit*, and would be hidden from view, as would be also the batteries for curved fire, which would be further in rear. The trenches would be disposed so as to command the ground in front, and from their low relief would scarcely be seen by the enemy. They would have no regular flanking defence, but the accessory defences would be placed sufficiently far in the front to delay the enemy's advance so that no attack in force would have a chance of success. The extreme dissemination of the means of action which the adoption of the preceding systems would inevitably entail, does not appear to be favourable to an efficient defence, it has therefore been suggested to join the works, so as to form groups capable of putting a large number of guns into line,* the object being to enable the defence to bring superior forces to bear upon important tactical points and to maintain them during the whole contest, and to render a prolonged defence possible, without entailing the construction of a number of temporary works. The central position would be fortified and surrounded by a line of groups of works, each group being about 8,000 *mètres* distant from the enceinte. For a fortress having a radius of 12 *kilomètres* † there would be about five such groups with intervals of from 14 to 15 *kilomètres* between each group. Each group would consist of a certain number of small batteries, arranged in two lines on the exterior, and in one line on the interior side. The total armament of the group would be 360 pieces of ordnance, of which 232 would be guns. The author considers that under these conditions, and with the protection of cupolas, the struggle could be advantageously maintained "against a modern siege park, which contains about 400 pieces of ordnance." The defence of the large intervals caused by this arrangement of the works would be based upon the combined action of the central position, the nearest groups of works, and the active defence. This grouping of works has by no means all the advantages which are claimed for it. It could not without the assistance of a large garrison, insure by itself the safety of a fortified place; but it would possess a real value in the case of the organization of a particularly important position in the first line of defence of a fortress, provided that all the works should not be organized as regular "points d' appui." In his work "La défense des Etats et les camps retranchés," General Brialmont remarks that he has, in "L' Etude sur la fortification des capitales," proposed to fortify the great centres by means of a small number of groups of works, each of which should comprise some "points d' appui," some intermediate batteries, and some emplacements for guns of position and light pieces. This organization, which shelters the various groups from attacks in force whilst permitting the development of a powerful artillery, necessitates more works than a place surrounded by a girdle of forts, and consequently a considerable increase of expense. This solution, therefore, would only be suitable for very large fortresses; and then only in the case of special points or of very extended places, not provided with a permanent enceinte. It is evident then, that neither the thin continuous lines, nor lines of groups of batteries, can constitute alone the first line of defence; well organized "points d' appui" are indispensable. These should not be much more than four *kilomètres* from each other. In this way, attacks in force will be easily repulsed by the sectional troops, and the necessity of too numerous garrisons will be avoided. Major Schumann, who advocates narrow intervals, and wishes to have as many guns as possible under turrets, would have the permanent works not more than 1,600 *mètres* distant from each other; which would be a very expensive arrangement, and would tend to impede the free movement of artillery. It would be preferable to have a line of "points d' appui" sufficiently near together, the pieces of ordnance intended for the artillery struggle being placed between them. Emplacements for the latter should be made in time of peace, or else, movable materials for constructing fortifications should be provided. In this way it is expected that a double result will be attained; viz., to secure the place against the attack in force of the field troops, when the enemy first approaches; and as soon as the investment is completed, to insure all the means of defence which can prolong the siege. General von Sauer of the Bavarian Artillery recommends* an entirely different system of defence. He is of opinion that the forts of the first line should be drawn nearer together than has hitherto been the case: and that they should be reduced in size, so as to receive smaller garrisons, and also so as to be more easily concealed from the enemy's guns; in addition to which they should be protected from vertical fire by means of turrets, which should be independent of the works. Each fort would thus consist of a single cupola, supported by a sort of low turret. These small works form the first line of defence, and would be arranged in a single rank at intervals of 1,000 to 1,200 *mètres*. The disposition and intervals between these forts might vary according to the position, and the vulnerability of the sectors they are intended to cover. General von Sauer considers that the increase in their number would not present serious difficulties, on account of their small size; and he estimates the necessary garrison at 20 men.

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* Brialmont, "Influence du tir plongeant et des obus-torpilles sur la fortification."

† "Die Befestigungs Kunst."

‡ "Le fortezze e l' assiedo. Rivista di artiglieria e genio." 1887.

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* "Sull ordinamento dei campi trincerati. Rivista di artiglieria e genio.' 1887.

† A *mètre* =39·37079 inches, 8 *kilomètres*=5 miles.

The cupolas should be armed with quick-firing guns only, and should form an impassable barrier, behind which are placed the heavy guns intended to maintain the artillery duel. Assuming an average length of 60 *kilomètres* for the first line of defence, and supposing the towers distributed uniformly in two ranks, at 1,000 *mètres* apart; a total of 120 towers is reached, with a garrison of 2,400 men. With intervals of 200 *mètres*, a double rank of towers, and garrisons of 12 men for each work, the total strength of the first line would be 7,200 men, a number still weak in comparison with those employed at present. It is, however, argued that these forts can only be compared to advanced posts, in so far as they are points of observation; where, from a fighting point of view, the comparison ceases, because advanced posts are supplied with constantly increasing reserves, whereas nothing of the kind exists in the system of fortification just described. In case of a combined attack on a number of forts at the same time, the garrisons would not be able to mutually support each other. The weak spot in the system appears to be the want of "points d' appui", and it is difficult to imagine that they can be absolutely dispensed with. This view is borne out by the efforts made on all sides to give to "points d' appui" their maximum value, so as to counteract the offensive tactics lately recommended, which we will consider further on, namely, to demoralize the defenders by vertical fire, and then to push on to the assault. The weaker the works of the first line, the greater will be the chance of success of such a system; but with good "points d' appui" not only will the possession of certain important positions be assured, but the defence of the intervals can be strengthened by powerful flanking fire. It also appears doubtful whether the system of lines of cupolas would not entail greater expense than that of "points d' appui." The promoters of the system urge that this would not be the case, taking Major Schumann's estimate of 125,000 francs for a two gun turret; but this estimate is probably too small.

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* "Tactische under suchungen uber neue Formen der Befestigungs Kunst." No. 721, page 739.

General Brialmont puts it at double, which would raise the expense of the 100 to 120 towers intended to replace the girdle of detached forts, from 10 or 12 million to 20 or 25 million francs.

The same objection is taken to the smaller towers containing a garrison of 12 men. General Brialmont considers the estimate of 25,000 francs as far too low for each work, putting it, with all its accessories, at 80,000 francs which would raise the cost of a fortified position of 60 *kilomètres* in extent, from 15 million to 48 million francs. It is generally, therefore, considered advisable to employ "points d' appui" containing infantry, and usually a very limited number of guns intended principally to assist in the defences of the intervals*, as it is recognized that artillery in the open could not live on the ramparts; but it is considered all important that the guns intended to bring a flanking fire on the assailants should be placed in positions of almost absolute security, which as the enemy is sure to attack them with all the means at his disposal, it is proposed to obtain, partly by placing obstacles, and partly by the use of armour plating and by defilading, which would be effected by means of the flanks of the works and the javelins of the gorge, which furnish positions in which the guns can be defiladed and at the same time they command a view of the intervals. As, in consequence of the continual progress of artillery, the expense and difficulty of organizing and defilading works is constantly increasing, it is considered necessary to reduce as far as possible the number of guns inside the works, and the amount of cover thrown up for the men and the armament. It is of course desirable that all the guns should be completely covered, but it does not seem either possible or advantageous to place them all either in "points d' appui" or in intermediate batteries similarly organized. Lieut.-Colonel Voorduin advocates that the guns of position should be divided into two unequal groups, of which the smaller, intended for the defence of the intervals and the neighbouring works, should be placed inside the latter, and covered by fixed or movable iron shields and by earthen screens, from which they can be withdrawn by special arrangements. The second group of guns would be placed in batteries outside the works, and from motives of economy would have no overhead cover, but would be concealed from the view of the enemy. It is questionable, however, whether the first group had not better be divided into two distinct sets, one for firing on the ground in front, and one for flanking the intervals. The guns intended to engage the batteries which the enemy would first place in position, and which would not contain any guns of heavy calibre, should be able to bring direct fire to bear with rapidity; and as by the time they would be overpowered by the enemy's heavy guns the defence of the intervals would be organized, it seems neither necessary nor practicable to place them behind covering screens. But though iron shields may suffice for the guns firing upon the ground in front, earthen screens must be used for those which are to defend the intervals. These should be defiladed as far as possible, in which case a much slighter structure might suffice, as from recent experiments it would appear that plunging fire is only efficacious if the striking points can be corrected by observations. In the "Duncan Gold Medal Prize Essay" for 1889, Captain Stone points out that "in future sieges the most difficult and responsible, as well as the most valuable work, will consist in the correct observation of the effects of fire, and the intelligent transmission of these observations to the batteries concerned."* It is, however, evident that the value of such dispositions will be increased, if the covering mass presents a considerable amount of resistance; and it has been proposed that these guns should be placed in the gorge of the works, where they would be sheltered as by a ravelin, and from whence they could fire upon the intervals. As to the defence of the works themselves, reliance is almost universally placed, partly upon the infantry garrison, and partly upon quick-firing guns and mitrailleuses, which can either be withdrawn under neighbouring casemates or protected by "eclipse" or revolving cupolas, as has already been described. With the assistance of passive defences, (ditches, obstacles, mines, &c.,) it is believed that they can be made impregnable as long as the ammunition lasts. This arrangement, to a great extent, agrees with the method which is likely to be adopted in our service, as in the Manual of Siege Artillery it is stated† "an active defender will for the future use the forts chiefly as a line of keeps and observatories in a great defensive position, the forts themselves only mounting such guns as can be thoroughly well covered; while a number of these guns, as well as a proportion of the artillery from works not engaged, will be posted in siege batteries between or just in rear of the line of forts, and connected with them by trenches: in rear of these trenches fresh batteries can be made, into which to shift any guns that may be too hardly pressed by the attack." It is certain that the "points d' appui" on the fronts exposed to attack would not be able, with the small number of guns that they could bring into action, to sustain the artillery duel; and it follows that now more than ever, all the armament which would be useless elsewhere, should be concentrated on the fronts attacked. It should be utilized on the same principles as those recognized in the attack, viz., the targets presented to the enemy should be as small and as little observable as possible. It will be necessary either to construct temporary batteries, well defiladed, between the "points d' appui," or to make arrangements for bringing up the greatest possible number of guns to the points required.*

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* On the other hand, the principle of placing infantry in works where there are guns is strongly condemned by several eminent authors. General Pierron in "Les Méthodes de Guerre actuelles", 1889, page 614, quotes a German artillery officer to the following effect. "To place artillery in detached forts is to thoroughly expose it to the concentric fire of the besieger's batteries and to have it rapidly crushed; the fort becomes a heap of ruins and its garrison lies buried under the rubbish. By the defender of a place the fort should be regarded as merely a point of support covering the line of artillery emplacements. He will therefore provide only infantry as a garrison which will guard the magazines that the fort should be designed to contain. The guns of the defence will be disposed in the intervals between, but somewhat behind the forts, and will, like the guns of the attack, take advantage of the undulations of the soil."

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* "Proceedings Royal Artillery Institution," 1889, Vol. 16. page 161.

† "Manual of Siege Artillery," page 14.

If the works attacked, form part of the exterior line of a great fortress, their intervals can frequently be used by the defenders to run up batteries or to bring up guns unexpectedly. The defenders, like the assailants, can act by surprise, and the transport of heavy guns from the fortress to the line of detached forts would certainly not present more difficulties than the attack has to contend against in establishing its batteries. Such will be, from an artillery point of view, the best way of conducting the active defence of the fortress. It consists of attacking the assailant with the fire of batteries temporarily established, even during the siege, in the intervals between the forts, which at the same time should offer as vigorous a resistance as possible.† In order to form an exact idea of the conditions of the defence, powers and means of action should not be attributed to the attack which are systematically denied to the defence.‡ Curved fire and the new explosives can be employed as well on the one side as the other, and it can easily be imagined that the defence may bring up to the threatened points as many guns, and make as efficient use of them, as the attack. There is no necessity to seek by an exaggerated use of guns under cupolas, or behind armour plates, for results which may easily be obtained by the adoption of methods similar to those employed in the attack.|| It may be urged that improvised batteries or gun emplacements would be exposed to open attacks in force, but the assailant is under less favourable conditions, thanks to the protection of the "points d' appui." The object to be aimed at, with regard to the exposed front, is then, to make arrangements for bringing up the greatest possible number of

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* "Le forme ed i materiali della nuova fortificazione, par le Capitanie du génie Enrico Rocchi.—Rivista di artiglieria e genio". March 1888.

† "Ideen über Befestigungen."

‡ "Ancora il ferro nella fortificazione, par le Major Lo Forte. Revista di artiglieria e genio." 1888.

|| "Revue Militaire de l' Etranger," Vol. 34. page 729.

pieces, for establishing them in defiladed positions, for furnishing them with ample supplies of ammunition, and for securing them against attacks in force. Several authors also advocate that the guns should be capable of being moved, which would diminish the chance of their being struck by the enemy's projectiles. In order that the artillery of the defence may be assured of a certain superiority over that of the attack, a considerable number of pieces must be brought into action in the intervals between the forts, corresponding to the points of attack. Major Schott allows 50 or 60 guns per interval, and as it is estimated that the zone corresponding to a point of attack will comprise about six fronts, from 300 to 360 pieces of ordnance would be required. General Brialmont* allows 240 pieces for the temporary batteries to be constructed in the intervals of the forts attacked, but he shows that this armament can and ought to be considerably increased, as soon as the attack has clearly developed itself. In the intervals of 3,000 *mètres* between the "points d'appui," 120 pieces could easily be placed in action, independently of those contained in the permanent works and the supporting batteries, which would give 360 for the three fronts attacked. With intervals of 4,000 *mètres*, each of them would contain 140 pieces, and the whole number corresponding to the three fronts would be 420.

The preceding calculations should apparently be considered as giving the outside limits, but they afford an idea of the number of pieces of ordnance required for the intervals. In order to facilitate the work of armament and ensure the supply of ammunition, &c, a good network of communications is required, connecting the permanent works, the magazines of sectors, and the central main work, with the temporary batteries or the probable artillery emplacements. It would be still better if the principal of these lines of communication were provided with rails. It is estimated that from 150 to 200 rounds should be provided for each piece beforehand, and that the consumption in 24 hours will be 80 rounds for medium, 60 for heavy guns, and 40 for mortars. This would necessitate for the artillery of the intervals only on the fronts attacked, a previous supply of 80,000 rounds and a daily consumption of 24,000 rounds, in addition to which, transport will be required for the materials of all kinds, so that some idea can be formed of the enormous amount of carriage which is necessary in order to keep up the artillery contest. Every effort should be made to diminish the length of the communications as much as possible, by distributing the magazines. The defiladed emplacements should be selected in rear of the general line of batteries, principally upon the reverse side of the slopes which surround the place. The railway intended to insure the armament and supply of the artillery of the intervals will, for a part of its course, follow a line not far from that of the batteries.

It has also been proposed by Commandant Mougin and other writers to use this railway for the transport of pieces of ordnance mounted on "eclipse" carriages; this would allow of the rapid disposal of strong movable batteries, which might replace the stationary ones whose construction could not often be undertaken until after the enemy's dispositions had been noted.* It can, however, scarcely be admitted that a railway of this kind could be established in peace time throughout the whole length of the first line of defence, but its construction as well as that of the batteries of the intervals, would probably be limited to the most exposed fronts. But though it might be necessary, on some parts of the first line of defence, to await the disclosure of the enemy's intentions before making a railway, this railway, when once constructed, would have the advantage of insuring the mobility of the guns and consequently of considerably diminishing the chances of their being struck. It is usually proposed to mask the railway with an earthen embankment, the top of which would be covered either with branches or with light plantations, but this epaulement would only be necessary for those parts of the trace which could not be defiladed by taking advantage of the features of the ground and natural cover. Some authors, however, advocate a continuous line of parapet, with a view of securing a good line of defence, capable, with the assistance of the "points d' appui," of insuring the safety of the intervals.

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* "La fortification du temps présent."

It is proposed to make infantry banquettes here and there along the embankment, and in case of need, emplacements for turrets, intended to contain quick-firing guns and mitrailleuses. The necessity would thus be avoided of constructing intermediate works for infantry between the forts, whenever their distance apart is too great, or the conformation of the ground does not permit of their sufficiently commanding the intervals. The trace of the epaulement will not, however, always allow of the formation of a good fighting line, and under these circumstances it will be difficult to utilize it with advantage; also, whenever possible an attempt would be made to do without it altogether. The parapet running along the railway, must then be considered more in the light of cover than in that of a fighting line: consequently, whether temporary fixed batteries or movable batteries on rails be adopted, the intervals should, for their own security, be placed in a state of defence by utilizing natural objects or by throwing up small intermediate works.† The organization of the first line of defence should be completed by the formation of good points of observation, as it is indispensable to make out the besiegers' positions as soon as possible, and to expose them to the chance fire of projectiles sufficiently powerful to do them serious damage. The choice of suitable points would be made, and the observers instructed in their special duties, beforehand.

Thus, every step would be taken to ensure, not only the power, but the quality of the fire of the defending artillery. It may be hoped also to take the initiative against the enemy, and so to delay him in completing his armament preparatory to opening fire. With intervals so prepared, the defenders will be in a position not only to keep up the artillery contest, but even to preserve a relative superiority of fire for a considerable time to the fortress. The "points d' appui" will ensure its safety, so long as the enemy has not at his disposal all the means necessary to undertake regular siege works. When the assailants have collected materials for that purpose, the preparations of the defenders will also be complete, and the artillery contest will begin under conditions favorable for the defence. This * is the result arrived at by a school, which, side by side with the partisans of temporary fortification and with the engineers who believe only in armour plates, wishes to place fortresses in a condition to reply to the blows under which it is urged that they will be crushed. This school, while depending largely upon the resources which may be furnished by science, recommends the employment against the attacking guns, of a defensive artillery not less powerful. It thinks to compensate for the inevitable inferiority of the garrison by the good organization of its "points d' appui," and by the action of the powerful fire both of infantry and of quick-firing guns; and hopes to be able to make use of this fire up to the last moment, thanks to the precautions taken to conceal from the view of the enemy the arrangements made for his reception.

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* "Le forme ed i materiali della nuova fortificazione.—Ancora il ferro nella fortificazione. Rivista di artiglieria e genio." 1887—1888.

† See Brackenbury's "Field works," pages 133—136, for descrition of latest type of British redoubt for infantry; also Plate VIII, Vol. 17. "Proceedings Royal Artillery Institution."—August 1889. Copied in Appendix.

Exterior Organization of Works of Permanent Fortification.†

The difficulties which the organization of the ditch and its flanking defences present, the tendency to adopt curved forms for the trace of the crest, and above all, the preponderance given to the defence by the adoption of quick-firing guns, have induced certain authors to propose some important modifications in the profile and trace of works. The means of resisting assaults should, according to their views, be assured principally by the full development of powerful frontal fire; while the use of the ditch and its flanking arrangements would, at any rate to a certain extent, be given up. Undoubtedly, in providing a large fortress with quick-firing guns, the defence will dispose of a force which must be considered very seriously; but the question is, if the results which will be thus obtained will justify the abandonment of obstacles, which, far from excluding the use of quick-firing guns would find in them most valuable auxiliaries. On the other hand, the defective conditions of the constructions in advance of the parapet, can be to a great extent improved; and it appears that powerful fire may be associated with the use of obstacles for the purpose of placing works in a state to resist the rapidly executed attacks, which may in future be made on them. Of all the parts of the ditch, the escarp, whether it be a full or demi-revetment, or a detached wall, is the most exposed; the object is of considerable size, and if it is wished to retain for the obstacle a sufficient width to prevent its being crossed by means of flying bridges, it becomes difficult to defilade sufficiently. Notwithstanding this, as escarps are always arranged in such a manner as to be hidden from sight, and are exposed only to a very plunging fire, their demolition should be methodically conducted. It is always difficult, if not impossible, to ensure the rectification of fire, and the observation of results obtained, and an enemy who counted on finding only some railings which he could easily pass over, would find on arriving at the ditch, that he had made a serious mistake. Whilst admitting the practicability of breaches, the presence of an escarp will, it is said, always facilitate the task of the defence by limiting the points where it would be possible to carry out the assault, but the use of escarps must, undoubtedly, be greatly restricted by their cost, which, already very great, will become much more so when they are strengthened to meet the necessities of the present day; so that it will often be considered preferable to replace them by obstacles which are less costly and less easily destroyed. Every deep ditch, which is not under direct fire from the parapet of the work, must be flanked, so as to do away with the disadvantage of the dead angle. Caponniers have always, up to the present, been hidden from the view of the enemy, and placed as low as possible, so as to be better defiladed; but their sides can still be struck by oblique and their horizontal surface injured by plunging fire. Their dimensions also, necessitate the carrying back of the revetment of the counterscarp to a considerable distance, so as not to diminish the value of the obstacle formed by the ditch; and thus the escarp can be more easily hit, whilst the demolition of parts of the wall not only produces breaches, but fills up the ditch with ruins which hinder flanking fire, if the caponniers are not provided with more than one storey. In addition, the head of a caponnier in a detached work is not flanked, and the surrounding ditch is not always sufficiently defended. Although not completely sheltered from projectiles, the counterscarp seems to unite in itself some conditions of resistance greatly superior to those of the escarp and the caponnier. It could only be struck by projectiles, which, having penetrated the glacis, burst against the masonry which is built up to support the earth, or by those, which, falling into the ditch, explode against the front of the wall or its foundations; but these can only be considered as chance shots. It appears that in many cases, it would be sufficient to revet the counterscarp, and give the escarp a gentle slope upon the front and flanks, but on the side of the gorge it would be better to make the escarp of masonry, and to slope the counterscarp.*

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* "Revue Militaire de l' Etranger." Vol. 34. page 733. 1888.

† "Revue Militaire de l' Etranger." Vol. 35, page 193, 1889.

As regards the deep ditches of the present system and their flanking, Major Schumann, who agrees on this subject with General von Sauer, has but small confidence in them, and does not believe them capable of preserving the works from assault. He prefers good accessory defences, combined with powerful fire proceeding from the work assaulted, as well as from others in the vicinity; with which object it has been proposed to substitute for the present means of flanking, which are so difficult to keep intact, a heavy fire coming from a low parapet and sweeping the bottom of the ditch. In the two solutions above indicated, the flanking defence of the ditch is suppressed, as the fire from the work should render an assault impossible. With this view, a large number of quick-firing guns are either installed under cupolas or retired under shelter, in readiness to come into action when wanted. The results of experiments executed up to the present, seem to justify this confidence. The quick-firing gun of 37 *millimètres*, placed under the Schumann system of cupola, fires 20 rounds a minute, and can be worked by two men. It has a range of 3,000 *mètres*. Major Schumann has proposed to place the cupola upon wheels, which would render it easily transportable, excavations being prepared in the parapet for its reception, so that only the upper crown would be visible. Mr. Nordenfelt is of opinion,* that for the defence of ditches, (caponniers), for disappearing turrets, and for ramparts, there must be guns that can be run about to any part of the fort that might be attacked; and for this purpose, he recommends the 6-pr. gun, six of which will fire, in one minute, either 25,000 lead bullets, out of shrapnel, for long range fire, or 60,000 lead bullets out of case shot, for short ranges. The short quick-firing Nordenfelt gun of 57 *millimètres*, can fire, with an average of 30 shots a minute shells containing 196 projectiles of 12, 14, and 16 *millimètres*, the range being very satisfactory up to 2,500 *mètres*. An almost similar initial velocity can be obtained with Hotchkiss quick-firing guns, and the mitrailleuses, Gardiner, and Maxim. Where greater results are desirable, recourse would be had to quick-firing guns of larger calibre, such as those of 70 *millimètres*, advocated by General Brialmont, and those of 84 *millimètres*, experimented upon in Germany in 1887, which appear to be able to fire 22 shots a minute; they can be worked by three men. Besides these powerful machines, the action of infantry armed with repeating rifles must be taken into account; but to produce its full effect, this fire action should be combined with obstacles, so as to delay the march of the adversary and finally to stop him altogether. The ditches of detached works, studied by Major Schumann, have little depth and no special means of flanking fire. They have for revetment of escarp and counterscarp, walls leaning against the earth with an inclination of $\frac{5}{1}$ and a height of about three *mètres*. The breadth of the ditch at the level of the summit of the walls is 25 *mètres*. These walls are covered by slopes, connected by berms, upon which the foot of the exterior slope of the parapet and that of the interior slope of the glacis, meet. The bottom of the ditch and berms are planted with shrubs, among which wire entanglements are arranged, so as to increase the difficulty of the passage.

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* "Rationeller Typus für permanente Befestigungen," by Julius Bussjäger, Captain in the Austrian Engineers.

However complicated the crossing of such a ditch may be, the operation does not appear impossible. The prolongation of the dip of the parapet, on which are installed the "eclipse" cupolas for quick-firing guns, only reaches the exterior berm. The enemy, who has succeeded in reaching the counterscarp, would be able, consequently, to establish himself in the ditch, to take breath there, and to make passages into the accessory defences at his leisure. To correct this fault, Major Schumann has contrived a plan for throwing some grenades or spherical shells, by means of metallic tubes coming out of galleries situated below the cupolas for quick-firing guns, which would roll into the ditch and there explode. This method is far from being completely satisfactory, for, not to speak of the obstructions which can be produced in the tubes, the inventor is obliged to recognize that many of the projectiles thrown in such a manner will have no effect upon the assailant. The ditch of the adjacent batteries consists of a simple excavation, about 15 *mètres* wide, containing accessory defences.

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* "Royal United Service Institution Journal," Vol. 33, page 28.

There is a glacis in front with a banquette for infantry. The slight depth of the excavation allows the quick-firing guns to command the bottom of the ditch in its entirety, whilst they can at the same time sweep the glacis and its approaches. These dispositions should be able to baffle the efforts of the assailants. The cupolas would afford sufficient protection to the garrison to enable the neighbouring works to prolong their fire until the moment when the enemy reaches the parapet. The system of mutual protection by small works is by no means perfect, as the instinct of self-defence, the action of the enemy's batteries, and the conditions of visibility, would detract sensibly from its value; and it is doubtful whether all the quick-firing guns would remain intact up to the decisive moment, and without them the accessory defences would not be as much protection as a good flanking fire of quick-firing guns. General Schott's * system is, in many respects, similar; the ditches on the enemy's side are deprived of flanking protection, but are furnished with escarps and counterscarps, made of masonry, and provided with galleries, from whence the ditch in front can be commanded but not enfiladed. In order to increase the resisting power of his "points d'appui," General Schott has recourse to an advanced counterscarp and glacis, which, being prolonged on both sides, form a protection to the guns employed in the intervals. This organization is completed by accessory defences, which are arranged at the foot of the advanced counterscarp, and are under the fire of revolving guns, placed under "eclipse" cupolas, which constitute the armament of this part of the "point d'appui." The advanced glacis and counterscarp are defences which appear to be from day to day more appreciated, as they delay the enemy's march for some time before he can approach the principal position, and so detain him longer under fire. Along the wall facing the place, accessory defences can be arranged, which can be well sheltered, and so would increase the value of the obstacles. The chief disadvantage to this system is its costliness. The escarp and counterscarp galleries use up a considerable number of the defenders, who cannot act until the enemy has penetrated into the ditch, and can take no part in the defence of the approaches, as has been remarked by several partisans of the suppression of escarps and caponniers.† It is therefore proposed to substitute for those now in use the profile shown in Fig 1.‡

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* "Zur Befestigungs Frage."

† "Principes fondamentaux de la fortification permanente," par Glinka Yantchaski.

‡ "Revue Militaire de l' Etranger." Vol. 35, page 201, 1889.

The counterscarp is alone retained, and would be revetted and surmounted with a glacis. At the foot of the high parapet would be established a low one, from the crest of which a very gentle slope, or sort of glacis, leads to the bottom of the ditch, which would be completely under fire from the low parapet itself. A horizontal space separates the foot of this glacis from the counterscarp. This disposition, compared with those generally adopted up to the present time, offers very great advantages. It abolishes the necessity of flanking fire. It has nothing to fear from breaches, as is the case when either full or demi-revetments or detached escarps are used. Such obstacles have the disadvantage, when the means of flanking are destroyed, of forming a dead angle, where the assailants after having passed the counterscarp, can reform, preparatory to advancing to the assault of the breaches without having anything to fear from the fire of the defenders. By placing accessory defences in the bottom of the ditch and on the lower part of the glacis of the low parapet, it is hoped that the progress of the adversary may be delayed so as to allow the close fire proceeding from the low crest to produce its full effect, whilst the troops who have not yet succeeded in passing the counterscarp will be covered with projectiles from the high crest. Lastly, the distance of the top of the counterscarp or glacis from the crest of the low parapet is sufficiently great to render the operation of crossing by means of flying bridges exceedingly difficult. The system, as above described, has been severely criticized.* There is a universal agreement as to the power of quick-firing guns; and in the organization of a place, the object of delaying the advance of the assailant should be kept mainly in view; but it is urged that this result will not be obtained by substituting for the ditch and its flanking protection, accessory defences occupying the same relative position; but rather, by carrying them well forward, which is easily practicable with ordinary profiles: and as these accessory defences can only delay the advance of the assailant, but cannot absolutely stop it, a flanked ditch becomes a necessity. To the objection that the different portions of this ditch can be destroyed by artillery, the reply is made that the defenders would then find themselves in the same situation as if they had not existed, and would have gained all the time occupied by the assailant in completing their destruction. The interest that the assailant would have, when attacking a fortress, in seizing one of the "points d'appui," shows that it is prudent to support the resistance that can be made by fire, by obstacles, and above all, by obstacles difficult to cross, such as a well flanked ditch. Besides, the value of the former is liable to be impaired by darkness, fog, &c., and as regards economy it is better to decrease the number of fortified places rather than to deprive them of any necessary means of defence.

In reality, these objections do not point to any diminution of confidence in quick-firing guns, but are intended merely as a warning against the suppression of obstacles, and their replacement by accessory defences, which should be arranged in advance of the place and not against the fortification itself. The flanked ditch, situated behind,

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* "Revue Militaire russe." May, 1888.

Fig. 1.

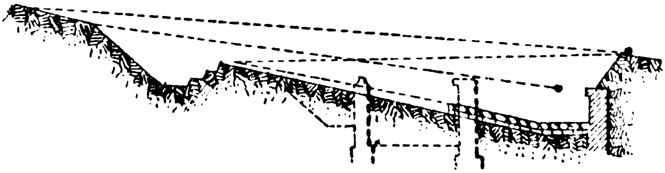
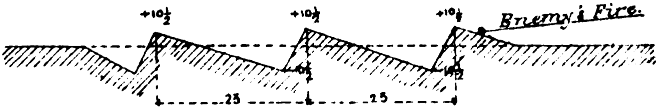


Fig. 2



"RIPPLE" SCREEN.

would be the true obstacle which would stop the enemy in the case of open attacks on a "point d'appui," and force him to fall back on the slow process of a regular siege; but for works of less importance, the profile, as above described, can be accepted, for it allows the retention of a part of the ditch without the inconveniences of a dead angle. Colonel Starynkevitch of the Russian engineers * argues that it cannot be admitted that the erections placed on the parapet can be kept intact until the moment they are required, whilst the flanking arrangements would be destroyed. The latter usually occupy low positions, which make them less difficult to defilade, hide them to a certain extent from view, and render their protection against direct fire comparatively easy. In discussing the arrangements for flanking fire, General Brialmont sums up the principal conditions as follows:—"Flanking fire is efficacious when the ditch is swept throughout its length and without interruption. It is a matter of consequence that this result should be obtained by means of a very small number of pieces of ordnance, so as to reduce as much as possible the armament of the flanking batteries, and the number of men required to serve them; and to do away, at the same time, with the disadvantage presented by large caponniers, of making holes in the counterscarp, through which the revetment of the escarp or of the detached wall can be breached: it will be necessary therefore, to abandon for the armament of flanking batteries unmovable guns which fire at most two shots a minute, and present besides two inconveniences, the first of which is the necessity of aiming afresh after each shot, an operation which is often rendered impossible by darkness and fog, and the second is the excessive dispersion of grape-shot, from which it follows, especially when the relief of the fortification is low, that a certain number of bullets reach the superior crest, and prevent the defenders from mounting on the parapet to repulse the assault."

Very satistactory results can be obtained with revolving or quick-firing guns, which remain pointed as long as they are in action, and require comparatively little room. Their rapidity of fire is such as to render them most efficacious during the short moments that they will have, in which to act; and the number of men required to serve them is but few. Mitrailleuses would be nearly as advantageous, but the double movement which it is necessary to give them in order to assure the dispersion of the bullets, and the delicacy of their mechanism, make them decidedly inferior to revolving or quick-firing guns, and of these the latter seem to be the most desirable, as they can throw in the same time, nearly double the number of projectiles; and when considered advisable, ordinary shells can be used with them. The special qualities of the quick-firing gun of 57 *millimètres* appear to render it the most desirable for flanking purposes, as it can fire 36 shots a minute, each containing 196 bullets. It is therefore permissible to conclude that the defence can avail itself of engines occupying but little space and possessing a very satisfactory accuracy and rapidity of fire. It is estimated that from two to four guns of this description will, according to the importance of the work, assure the effective flanking of the ditch.

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* "Revue Militaire de l' Etranger." Vol. 35, page 352, 1889.

It is an important question as to whether they should be placed in caponniers along the escarp, or in counterscarp galleries. The answer depends evidently upon the degree of protection which these emplacements will be capable of assuring them. Caponniers, on account of their vulnerability, would be useless without thick walls of cemented betony, with metallic roofs; and however small may be the space occupied by the guns, their horizontal dimensions must be considerable, and in order to reduce them it is proposed to employ either fixed or movable turrets. General Brialmont* says—"The necessity for placing the most important pieces under protection from direct, curved, or high angle fire, cannot be contested: the employment of armoured batteries will restore the balance of advantage in favour of the defence." With reference to the above, Captain Stone is of opinion† that, "to deliberately offer a large mark to the enemy's fire by mounting a number of the worst guns we possess in an important position, such as the flanking works of a ditch, is to court defeat, and is an economy of the falsest kind; what we require is a strongly armoured battery of the smallest dimensions, mounting a very few quick-firing guns of about four inch calibre, and capable of doing the maximum of work in the minimum of time and space." Major Schumann proposes a fixed turret, capable of holding four revolving guns of 37 *millimètres* (two on each face), with sloping iron roof, and sides of cast iron, resting on a bed of cemented betony. Besides the embrasures, there are nine loopholes for riflemen. This double caponnier projects about six *mètres* from the revetment, or from the slope of the escarp, and the mean outside width is 8 *mètres*. The same author proposes for the salients and shoulder angles, a revolving cupola for two quick-firing guns. This cupola, which would only measure 2·15 *mètres* in diameter, and weigh 18,000 *kilogrammes*,‡ would move upon slides. The cost price of the cupola, not including the masonry, would be about 32,000 francs; which, for a work having its salient and shoulder angles thus organized, would entail an expense of about 98,000 francs.|| Among the different types of caponniers studied by General Brialmont are those with one or two stages. The addition of a second storey appears indispensable when the width of the ditch is so restricted as to cause it to be feared that the falls of earth resulting from the effects of the enemy's fire would create any considerable amount of cover; but the greater the height of the caponnier, the less easy will it be to defilade. The difficulties of the construction of caponniers have for some time caused attention to be directed to the use of counterscarp galleries, the adoption of which appears to furnish a solution, acceptable from many points of view, of the question of flanking. By carrying back into the counterscarp the defence of the ditch, the caponniers, with all their drawbacks, might be abolished.

Counterscarp galleries are more difficult to destroy than caponniers, and the pecuniary gain resulting from the suppression of the latter would

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* "Fortification du temps présent," page 144.

† "Royal United Service Institution Journal," Vol. 33, page 20.

‡ 1015 *kilogrammes* = 1 ton.

|| "Die Bedentung drehbarer Geschützpanzer Panzerlaffeten, für eine durchgreifende Reform der permanenten Befestigung."

nearly compensate for the difference between the cost of casemates in the counterscarp and a simple retaining wall, which would always be necessary. In the types of permanent fortification discussed in a technical Russian publication, "Le Journal des Ingénieurs," the method of flanking by counterscarps is considered the most advantageous, whenever, the ditches being dry, it is possible to put the galleries in communication with the interior of the work by means of a subterranean passage under the ditch. This mode of flanking can be easily applied in cases when the slopes or walls are of an irregular form. Whilst raising these shelters sufficiently to ensure that the ruins which might accumulate in the ditch would not mask the loopholes, the galleries might still be constructed so as not to reach a height of more than 3½ *mètres* from the bottom of the ditch, so that if the relief of the crest of the glacis is about eight *mètres*, they will be well sheltered. It has been urged that counterscarp galleries are more exposed than caponniers to mining operations, by which means the assailant will endeavour to destroy them, when the result would be that the ditch would be no longer flanked; but the fact that he would be forced thus to fall back on the slow methods of subterranean warfare, is of itself a matter of considerable importance. The employment of counterscarp galleries also enables the escarps to be rounded oft, whilst avoiding almost completely the necessity of dead angles; also, if the escarps are not revetted, the consequent widening of the ditch presents but few inconveniences, as blindages will be used to protect parts of the ditch that may be exposed to flanking fire. To sum up, in the majority of cases the method of flanking by means of counterscarp galleries is preferable to the use of caponniers, which will, as a rule, only be employed in the case of forts with wet ditches, which do not allow of revetted counterscarps.* As regards the ditch itself, Colonel Starynkevitch is of opinion that—

1st.—"Such an obstacle is necessary for important works."

2nd.—"The study of examples afforded by former wars, far from demonstrating the uselessness of vertical obstacles, and of their flanking, seems to prove the contrary."

3rd.—"All efforts should tend, not only to develop the power of fire coming from fortified works, but also, by increasing the obstacle, to shelter them from an attack."

4th—"The fear of seeing the different parts of the ditch prematurely demolished is exaggerated, as defilading and the impossibility of the assailant being able to observe the effect of his fire assure some very satisfactory conditions of resistance."

5th.—"The plan of replacing passive obstacles by the active power of fire cannot be considered advisable, because this latter has always constituted an essential element of the force of works. This organization would result in the deprivation of one of the means of defence, which seems to be unadvisable."

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* Brialmont.—"Influence du tir plongeant et des obus-torpilles sur la fortification."

It would be difficult to say how far these conclusions should be accepted, but it is not without interest to compare them with the opinion which bases the security of works solely upon the power of fire directed against the assailant at the moment when he is making the attack.

Major Clarke, in a paper on "Land Fortification" recently published in the "Proceedings of the Royal Artillery Institution," recognizes the fact that there must come a stage when the advance has to be made without any aid from the artillery of the attack, and that the conditions under which such advances have hitherto been carried out, have been completely altered by the introduction of magazine rifles. "The artillery of the attack would formerly endeavour to keep the defenders from their parapets up to the last moment, and during that last moment the fire of the defence would necessarily be weak. Hence arose the vast ditches, the elaborate arrangements for flank defence, the caponniers, counterscarp galleries, &c., of the various systems of fortification. The repeating rifle has now rendered all these expedients absolutely unnecessary. The intensity of fire which a single line of men can deliver upon a given area exceeds enormously the maximum formerly attainable by the combination of every conceivable system of cross flanking. To guard against surprises, and to give that security which is necessary, even to the best troops acting on the defensive, an obstacle is still required, which in some cases may be a ditch, but which can be far more effectively provided in other ways. A revetted ditch appeals to the imagination more powerfully than a sunk iron fence and a broad belt of entanglement or abatis under modern rifle fire. This is a consideration which should not be forgotten, but as an effective obstacle the latter is infinitely superior. A line of steady troops covered by a parapet, protected by an efficient obstacle under its fire, and amply supplied with ammunition is now unattackable by assault."*

A *résumé* has lately been published† of a brochure written in 1882 by General Cosseron de Villenoisy, in which the author expresses himself as in favour of the retention of the ditch as an obstacle. He says that "it is erroneous to substitute for the escarp only the counterscarp, as the facility for offensive action from within a work is thereby lost to the defenders, in addition to which, the moral impression on troops deprived of the protection of an escarp revetment or of a ditch full of water must also be considered; they never believe themselves to be secure, and they have reason for the idea. The detached palisade wall which some have proposed to erect at the foot of a sloping escarp is apt to facilitate the passage of the ditch by an enemy, as it constitutes a support for flying bridges and ladders, by means of which the ditch may be crossed. In short the passive obstacles, provided by the ditch, should not be diminished so far as to compromise the security of a work. A large ditch will always be one of the best pieces of fortification, a high escarp the best guarantee against surprise." With reference to this opinion, Colonel Ross remarks that escarp and counterscarp revetments are costly affairs, and may now be easily breached from a long distance by the employment of dynamite shells. "It is not possible," says a French engineer officer,* "except at a cost absolutely out of all proportion to the object to be attained, to construct revetment walls capable of resisting modern means of attack; henceforth let the ditch, as an obstacle revetted with masonry, be abjured."

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* "Proceedings Royal Artillery Institution." Vol. 17, page 225, 1889.

† "The attack and defence of entrenched camps, by Lieut.-Col. Ross, R. E. Proceedings Royal Artillery Institution." Vol. 17, page 304, 1889.

Methods of arming batteries and the construction of armoured turrets.

1.—*Earthen barbette batteries, with or without disappearing carriages.*

These will give a wide lateral range, and are very inexpensive. They require to be fully 100 feet above the ground over which the enemy would advance, as otherwise, guns and gunners would be too exposed. Captain Stone is of opinion that a couple of well placed earthen barbette batteries, containing a dozen quick-firing guns, might do more for the defence of any given position than the most approved casemated battery or turret mounting an 80 or 100 ton gun.† The same author, in the essay which gained the "Duncan" gold medal prize, says that it has been ascertained beyond a doubt that lyddite and the whole category of high explosives which have met with so much success against iron and masonry, are practically of no more value than gunpowder against earth works.‡ On the other hand, Captain Stone mentions the power of accurate howitzer fire to breach earthen parapets as having been shown by experiments at Dungeness in 1882, when an earthen parapet, 30 feet thick, was breached by seven rounds (six effective) of eight inch howitzer common shell at 1,200 yards range;‖ and Colonel Brackenbury states ¶ that "the high explosives, as bursting charges for shells, have been found capable of clearing away everything in the shape of earth works." Disappearing carriages give cover from direct fire, and can be used in pits or sunken emplacements which offer no target. They would, however, be difficult to repair during an action, should any thing go wrong with them.

2.—*Earthen batteries with iron embrasure shields.*

When ordinary barbette batteries would be too much exposed, and wide lateral range is not essential, the guns may fire through embrasures protected by iron shields. They must be 20 yards apart, and bombproof cover should be provided.

3.—*Casemated batteries with iron embrasure shields.*

When space is confined, and many guns are required, they must be placed closer, or even tier above tier. Stone or iron must then replace earth. This might give security against vertical fire, but the crowding of the guns is inconvenient, and the explosion of a magazine would be most disastrous. Sebastopol, Bomarsund, &c., were long lines of masonry with casemates and openings for guns to fire through. Casemated batteries were then introduced, but it was found that the granite was knocked to pieces, even by 9·2 inch guns, whereas 17 inch guns would now be available in fortress warfare, besides which, masonry splinters badly. At Port Lobos a six inch howitzer, throwing a shell containing 11 lbs. of explosive gelatine at a range of 1,100 yards, made a breach in a rock escarpment, six feet deep and 25 feet in diameter, splinters being thrown to a distance of nearly 900 yards.*

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* "Méthodes de guerre actuelles," 1889, par le Général Pierron, page 432.
† "Royal United Service Institution Journal," Vol. 33, page 13.
‡ "Proceedings Royal Artillery Institution," Vol. 17, page 157.
‖ "Royal United Service Institution Journal," Vol. 33, page 17.
¶ "Field Works," page 354.

4.—*Iron or steel batteries with fixed or revolving turrets.*

Iron stands fire better than concrete, but is far more expensive. Revolving turrets, if of sufficient strength, are very effective, as they combine the security given by shields with more than the lateral range afforded by the barbette system, whilst the ease with which they can be turned, gives special facilities for firing at moving objects, or for averting the gun ports from the enemy while the gun is being loaded.

The question of armoured turrets is of vast importance in the warfare of the present day. It is said that troops, when shut up in fortresses, soon lose their moral tone, and that upon this fact is founded the tendency of modern writers to urge the abandonment of the regular methods of attack and the adoption of sudden assaults. They believe† that after a bombardment more violent and more prolonged than those of former wars, the defence will be so enervated that it will be obliged to succumb, without having force enough to stop the assaulting columns. Matters would not be so simple if the fortress were organized with a view to maintaining an active defence. Doubtless, if a projectile charged with 75 *kilogrammes* of powder falls into an attacking battery, it would be placed entirely *hors-de-combat;* and as the assailant has no armoured shelter he is more exposed to destruction than the defender. It follows therefore, that in order to defend itself with success, a fortress has no better method than that of proceeding to the attack. But in order to do this, the defender must have at his disposal guns ready to act at every instant of the siege. But artillery cannot remain on the parapets, on account of the accuracy of curved fire, for which reason its protection will be more a matter of necessity than was formerly the case. Two solutions present themselves; the first consists in the employment of a very mobile artillery, which, for the most part, would be outside the works, and which would make use chiefly of indirect fire in order to hide itself from view. This arrangement would not answer for pieces of heavy calibre, whose mobility is in inverse ratio to their weight. It does not, however, demand any great expenditure of money, and its introduction would be facilitated, as we have seen, by the construction in peace time, of railways for the conveyance of guns and materials. The second solution consists in sheltering the guns by means of armour, and it alone is applicable wherever there is but a limited space available, or where very large pieces of ordnance are required. It necessitates some alterations in fortification, which will now be considered. Many works now contain armoured batteries, which, however, are faultily constructed through having fixed embrasures which expose them to rapid destruction.

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* "Royal United Service Institution Journal," Vol. 33, note to page 14.

† "Revue Militaire de l' Etranger," Vol. 17, page 658.

The Grüson turrets or cupolas are composed of a series of sections, each section weighing 80 tons, and the whole weight of the metal (chilled cast iron) being 1,800 tons. These weights are for a fort 60 feet in diameter, and mounting two Armstrong 105 ton guns. The segments are cast in iron moulds, by which means the surfaces are chilled and hardened. They are put together without bolting or backing of any kind, each segment interlocking with the other. Their special form and weight give the necessary support and coherence between the several parts of the completed turret which is of a mushroom shape. The resistance of the Grüson system to artillery fire is due to the toughness of the interior part of the armour, combined with intense hardness of the surface, and the angles of construction which are presented to fire. Its endurance depends not only on its interior tenacity and surface hardness, but also on the great size and weight of the plates or segments, which qualities combined, develop to the full the advantages of chilled cast iron armour.*

Until lately, the cupolas manufactured at the Grüson foundry were made of cast iron ; but the use of this comparatively cheap and easily obtainable material was necessarily given up when cast iron projectiles were replaced by harder and longer ones made of steel, which penetrated like wedges into the iron, and made crevices therein with a most alarming rapidity. Cast iron is now only used for the glacis plates of cupolas, and as these are as necessary for the preservation of the turret as the armour itself, its use will probably soon be altogether discarded. Steel, chilled and tempered, has a double advantage, as it prevents waste and thus lessens the cost, and whilst enabling the crowns to be made of a single piece it also enables the thickness to be varied, which is an important matter, for when it is uniform the weakest parts are those nearest the sides, which are the most liable to normal blows. The greatest resistance is at the centre and at the top of the crown. Iron is not as hard as steel, and it can also be more deeply cut by projectiles, but their action is local and does not extend beyond the point which has been struck. A steel plate submitted to a prolonged fire splits more quickly than one made of iron. It is better therefore, to employ iron as a rule for fortresses, and steel where a continued bombardment is not probable, on board men-of-war for instance. There is also a compound or mixed arrangement, *viz.*, a plate of iron and one of steel, soldered one upon another, the composition of which may be varied. That of the German cupola experimented upon at Bucharest in 1885 and 1886 had a thickness of 13 *centimètres* of iron covered over by a bed of steel of seven *centimètres*. After a certain number of shots the steeled portion became separated from the iron. This fact, which is not exceptional, tends to give the preference to iron.

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* "The Broad Arrow." 26th May 1881.

As regards expense, wrought-iron costs 30 to 40 per cent. less than the compound, and 10 per cent. less than wrought-steel, all three being of equal thickness; and as it has stood the test of various experiments successfully, it may be said to be the most useful metal for the construction of turrets that has yet been brought to notice.

For the sake of distinction* armour may be divided into two classes "soft" and "hard." Under the head of soft armour may be included all shields which admit of perforation, which when possible, is the best method of attack; and it therefore includes all kinds of armour consisting of wrought-iron only, whether laminated, plate-upon-plate, or solid chilled. Iron armour was first experimented upon in 1868 with success, and in 1873 it met with marked approval. After the Spezia trials of December 1876, steel and steel-faced armour came gradually into use. Hard armour which cannot be perforated, includes chilled cast iron and, in most cases, steel-faced armour and steel. Wrought-iron and chilled iron represent soft and hard armour to the full extent. Wrought-iron resists and suffers locally, hence perforation is comparatively easy. Except in the immediate locality, however, the plate is little injured. Thus, seeing that it is generally impossible to strike the same spot twice, wrought-iron is singularly well suited for resisting long continued attacks from the fire of such guns as have not power to perforate it completely. On the other hand it is more open to the passage of projectiles carrying fire into the interior than any other kind of armour. In all this, chilled iron exhibits the very opposite qualities. In has the power to distribute the shock of impact through its mass. It probably never has been, and never will be perforated. It yields by fracture and general disintegration. Long continued fire is what tries it most; and though the effect of the blows may appear to be slight, it cannot be doubted that the mass into which the shock is transmitted suffers gradually, and the blows tell more and more as the firing proceeds. Chilled iron is well suited to throw off shot striking obliquely, whilst in wrought-iron they have the best opportunity of biting. A blow enormously out matching wrought-iron makes a clean hole and effects the maximum possible of mischief behind the armour, and the minimum on the armour itself. Such a blow will probably effect the minimum of injury on material protected by chilled iron shields, while it will involve the armour itself in wholesale ruin. Lastly, wrought-iron lends itself to the work of strengthening shields by additional frontal plates, while finality is involved in the nature of a chilled iron shield, to which it would be out of the question to make additions.† Grüson's chilled iron shields in one or other form have been adopted by several Powers. Germany has adopted cupolas and batteries for coast and river defence, Belgium and Austria also have Grüson's armour. Italy has ordered chilled iron casemates for Alpine forts, and has recentiy adopted two chilled iron turrets of great magnitude, each to contain two 119 ton Krupp guns for the defence of Spezia harbour. France for a time adopted Grüson's armour for inland defences. This has subsequently been given up; and this class of shield in France, as in most other countries, is approved of only for coast defences.

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* "Short history and description of armour and its attack by artillery, by Captain Orde Browne, late R. A. Proceedings Royal Artillery Institution." Vol. 14, page 29.

† "Proceedings Royal Artillery Institution." Vol. 14, pages 627—641.

In 1882 it was found that while chilled iron projectiles were broken up harmlessly against chilled iron, this was not the case to the same extent with steel projectiles whose tenacity enabled them to deliver more work at the point of impact and produce much greater effect. Hence it was concluded that chilled iron shields might be broken up under a long continued fire of steel projectiles, and on that account it was better suited to coast defence, where ships could not maintain a continued attack such as might be conducted in regular inland breaching operations, as there is no likelihood of a ship being able to remain opposite a fort many hours, much less day after day; and the power to resist a few heavy blows is therefore what is called for. This power, Grüson's system of chilled iron admirably supplies. The coast armoured forts of foreign nations are made almost entirely of chilled iron, whereas the English coast forts are protected with wrought-iron and compound armour, consisting of wrought-iron foundation plates, to the front of which are attached steel "face plates," thus giving the combination of hard surface and tough back or body. None of our inland defences are protected by armour.* In "L'Avenir Militaire" of the 18th October 1889, mention is made of St. Jacques metal, which is an extra soft description of steel, presenting a greater power of resistance together with a malleability at least equal to that of iron, and offering a greater resistance to perforation than the last named metal. It is added that the Belgian Government thinks of using it for the cupolas destined for the defence of the valley of the Meuse.

With respect to the question as to whether the turrets should be constructed to hold one or two guns, military reasons are in favour of the former, while financial ones point to the opposite conclusion. The two-gun turrets may be objected to on the following grounds:—

1.—The armour is weak at the embrasures and in the intermediate spaces. If the hostile guns are, at a distance of 1,000 *mètres*, pointed correctly as regards elevation, and direction, they will fire as soon as the smoke from the turret is visible, *viz.*, after an interval of half a second. The passage of the projectile will take up about two and a half seconds, so that whatever may be the speed of rotation of the cupola, all the shots will strike in the vicinity of the embrasures; or if the guns protrude beyond the armour, as was the case at Bucharest, they will themselves be struck obliquely: it is therefore important to diminish the extent of the weak portion of the armour. This objection does not apply to "eclipse" turrets.

2.—When one of the guns is put out of action the other cannot fire during its replacement; if the latter operation is not feasible, the turret is not more powerful than if it had been made to hold only one gun, and runs a double danger since there are two openings exposed to fire; also, it is not impossible that an unlucky shot might throw a gun off its carriage, and render the service of its neighbour impossible to carry out.

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* "Proceedings Royal Artillery Institution." Vol. 14, pages 627—641.

3.—The two-gun cupola requires twice as many men as the other; therefore the shots entering by the embrasures may place *hors-de-combat* double the number of men; and in addition, these shots will be twice as numerous.

4.—When an accident happens to a two-gun cupola, two pieces are put out of action, whilst the same accident has less grave consequences in the case of a cupola constructed for one gun only.

5.—The same time and the same consumption of ammunition will reduce both cupolas to silence. It is evident, therefore, that when attacked by a similar number of pieces, two separate guns will resist twice as long as if they were in the same cupola. In favour of the two-gun turrets it may be said that—

1.—It is sometimes useful to fire at a single object two simultaneous shots, in order to increase the danger and the moral effect; but the Bucharest experiments have demonstrated that on account of differences in the state of the powder, electrical communications, bore of the gun, &c., the two shots are never fired exactly simultaneously, and therefore never exactly on the same spot. In fact, the recoil caused by the first shot tends to turn the cupola on its axis and to raise its front part. It may therefore be affirmed that rapid and precise salvos can only be obtained with separate pieces.

2.—The minimum height of the crown being fixed by the necessities of service, and the diameter of the two-gun being greater than that of the one-gun cupola, the former may be given a greater amount of curvature, or a less convexity, which would add to the power of resistance, but as the size of the object also increases, this advantage is doubtful.

3.—With regard to the armament, the employment of two-gun cupolas will allow of the dimensions of batteries and forts being reduced, which would be an economy; but this assertion rests on the hypothesis that in future a considerable number of pieces will still be united in works. Many engineers, however, General von Sauer for instance, demand the complete dispersion of the armament, in order to diminish the size of the object.

4.—General Brialmont says that a two-gun cupola costs 40 per cent. less than two one-gun cupolas; to which, however, Major Schumann* replies that he would undertake to construct two one-gun turrets at the cost of one two-gun cupola, similar to that used at Bucharest; as he proposes to place the platform for his armoured carriages 1½ *mètres* below the natural surface of the ground, which would render them as little visible as the attacking batteries, and would save the great expense of the foundations; but for this arrangement the absence of water and rock is essential. He proposes to place 800 shells inside the cupola; which, for a single piece of 15 *centimètres*, would have a diameter of from 4½ to 5 *mètres*, and he urges that 1,600 rounds could not be placed in the lower storey of a two-gun cupola, so that the necessity would arise of refilling from other magazines. It is even doubtful whether 800 rounds will be a sufficient supply to provide, as an armour sheltered gun should be considered as an equivalent to several pieces without bomb-proof protection, and a more sustained fire will be necessary than was the case with the old artillery of a fort. Supposing an average of 10 rounds per hour, and a fire of 15 hours per day, in five or six days the ammunition would be exhausted, so that it would appear more prudent to shelter 1,500 rounds per gun, but this is to a great extent a matter which would be determined by the state of the communications between the turrets and the magazines in rear. The cost prices of the cupolas projected by Major Schumann in 1886 were—

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*"Internationale Revue über die gesammten Armeen und Flotten June 1886. Die Panzerlafetten und ihre fernere Entevickelung."

Cupola for one gun of 15 *centimètres*	...	93,750	francs.
„ „ a howitzer of 21 „	...	81,250	„
„ „ a rifled mortar of 21 „	...	45,000	„
„ „ a revolving gun	...	17,000	„

Not including the pieces of ordnance. The cost of a Grüson cupola for two 6 inch guns = £ 7,500, or 187,500 francs.[*]

Frederick Krupp has proposed a solution between the cupolas for one and two guns. His turret contains one gun and two carriages, and is provided with two embrasures. The gun has a spherical mouth: it is fastened to the armour, and is without recoil. The second embrasure is closed by a steel plug, which is bolted upon the armour, and nothing on the outside reveals its existence.

When a shot on the embrasure disables the gun a spare piece is placed upon the second carriage, and the remaining embrasure is opened.

The interruption to the fire would only last for a quarter of an hour.

The carriages, not having to sustain the recoil, are light and easily movable upon rails. This cupola has not yet been tested by experiments.

The cylindrical form of cupola is the oldest and simplest, but it is inferior to the spherical form, being more exposed to normal blows.

As regards the method of turning a turret, a pivot, especially if it is hydraulic, permits of a reduction in the number of workmen and lessens the time necessary for a revolution; but the latter is not a point of great importance, unless a hostile gun happens to be pointed and loaded, ready to fire as soon as the smoke from the turrets is visible.

It has been proved at Cummersdorf that the loading of a 15 *centimètre* gun takes one minute, that of a howitzer of 21 *centimètres* three minutes, and that of a mortar of 21 *centimètres* four minutes; whilst a turret can, without difficulty, be made to take a complete turn in one minute. The hydraulic pivot is so easy to work, that by means of a small hand pump one man can raise, to a height of from 40 to 50 *centimètres*, all the movable part of the construction, which facilitates the clearing away of rubbish, and also enables the aim to be taken as regards direction; after which the cupola may be lowered, so as to steady it before firing. On the other hand, a pivot has certain inconveniences which apply principally to the two-gun turrets. When the discharge from the two pieces is not simultaneous, the recoil from the first causes a movement of rotation; and a deviation of five *millimètres* corresponds to an error of four *mètres* at a range of 2,500 *mètres*. General Brialmont is of opinion* that it will be prudent to limit the use of the hydraulic pivot to the one-gun cupolas ; and it has been proved that the cupolas turning upon slides or friction rollers are steadier during their rotation, besides being less complicated in their construction than those worked by means of pivots.

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[*] **Brialmont. "Fortification du temps présent," page 300.**

Indirect fire has for some time been advocated in France, and Major Schumann employs it almost exclusively in his latest projects; its chief advantage is the possibility of concentrating upon certain points of the attack, the fire of pieces which are themselves hidden from view. A cupola constructed for indirect fire can thus be concealed by the aid of an earthen mask, which shields it from direct fire ; while it can only be attacked by means of pieces of ordnance firing with reduced charges, the effect of which is less dangerous. It will also be able to search all the ravines and folds of ground, which cannot be seen, but which, however, are within range ; and it will enable the fire to be prolonged during the night and in foggy weather ; whilst it will also have the advantage of securing the gunners as far as possible, by not necessitating their exposure to hostile fire. There are, however, doubtless several faults. It is far from certain that the observers, who communicate with the turrets from outside by means of telephones, will give correct information regarding the points fired at ; as the armoured observatories in which they would be placed, may be themselves destroyed, or the electric or telephonic wires may be broken. Also, if the enemy after a violent bombardment, applying the theories of General von Sauer, throws forward his assaulting columns, provided with ladders and flying bridges, in order to cross the ditches, they will probably not be arrested by cupolas constructed for indirect fire, though the latter would certainly be of use in the *réduits* of forts ; and General Brialmont intends to supply those which are being constructed for the defence of the Meuse with them, but it is his intention that they shall also be utilized for direct fire upon the interior of the works. Direct aim can no longer be taken through the embrasures, because the employment of shell torpedos will necessitate the separation of the interior from the exterior of the turret. There remains, however, the man-hole which is a German invention, as well as the aiming groove. The former should be closed by an obdurator, which will only be lifted when necessary, it will generally be used for long distances, while for short ranges the aiming groove will be found more convenient. The suppression of recoil has been for a long time an article of faith with the German engineers, and the Grüson works have constructed some recoilless guns which are fastened into the armour, one of which has fired more than 1,450 rounds without sustaining any damage, while another, which was placed in one of the forts on the Italian side of the Alps, fired without injurious effect in 1886 more than 1,500 rounds with a charge of eight *kilogrammes* of prismatic powder. It is therefore probable that in future, turrets will be thus constructed to avoid recoil. It is also certain that any kind of armour built up in

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* Brialmont. "Influence du tir plongeant et des obus-torpilles sur la fortification."—Page 152.

segments, as that of a Grüson turret, is affected most seriously by being struck two or three times in the same place, a result which can easily be obtained by the use of quick-firing guns, whether they are on the Hotchkiss, Armstrong, or Nordenfelt, or on the automatic Maxim system, which are practically non-recoiling; and thus the necessity is avoided of relaying after every shot when firing at a stationary object. A three-pounder Maxim gun, firing 20 rounds a minute, which is not more than one third of its maximum rate, has a penetrative effect of four inches into armour plate, while the result of successive rounds striking the same spot would be difficult to estimate.* At Buchan a single segment of a Grüson turret broke up under four closely adjacent hits from a 12 inch gun.† The importance of glacis plates is almost equal to that of the turret itself. If they are not sufficiently strong, the enemy can destroy them and reach the foot of the turret without touching the armour; and for this reason the use of cast iron, which has been retained for these plates up to the present on account of economy, should be given up, and its place taken by wrought-iron. Cast iron may, however, be retained for the glacis plates of cupolas constructed for mortars. Whatever metal is employed, the glacis plates should be sufficiently low to prevent any shell that may burst in the bed of betony in front of them, from striking the working room of the turret.‡ In order to diminish the danger of shots striking the embrasures, and of the cupola being hit by successive rounds on the same spot, it has been proposed to give the turrets a continual movement, which is a matter of difficulty except with those that work on a pivot; but as the German turrets turn upon slides, Major Schumann invented in 1886 some "eclipse" turrets, which are sheltered from direct fire in the "eclipse" position. When firing, they are raised about 30 *centimètres*, and as soon as the shot has been fired they disappear, being thus only exposed for three or four seconds.

If the thickness of such a tower is equal to that of the French turret at Bucharest, *viz*:—45 *centimètres*, it might be considered as indestructible by direct fire. But Major Schumann gives it only 10 *centimètres*, and General Brialmont proposes 20, which is decidedly insufficient, as though a normal blow is not probable it is quite possible. An "eclipse" cupola for a quick-firing gun of from 37 to 53 *millimètres*, the object of which is to repulse the enemy's assault, has not to fear this heavy artillery, which is then unable to fire through fear of striking its own troops, but it is only exposed to field pieces, which would be brought up rapidly on the flanks of the attack; in which case a thickness of from 15 to 20 *centimètres* would suffice; but should it have to fight against pieces of large calibre, a thickness of from 30 to 40 *centimètres* would not be too much.

The penetration of a 4¾ inch quick-firing gun into wrought-iron is 10½ inches.
Ditto ditto 5¼ ditto ditto ditto 15 do.
Ditto ditto 14-pounder. ditto ditto 8 do.

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[*] Captain Stone on "Quick-firing guns for fortress defence." Royal United Service Institution Journal. Vol. 33. page 9.

[†] "Proceedings Royal Artillery Institution." Vol. 15, page 182.

[‡] Brialmont, page 177.

General Brialmont* proposes to exclude from the armament of fortresses, "eclipse" cupolas for two guns, of a calibre equal to, or greater than 15 *centimètres*, on account of their weight. He rejects steam engines, hydraulic pivots, and all complicated mechanisms, and is of opinion that "eclipse" cupolas should be employed to counter-batter the siege batteries, and that ordinary revolving cupolas should be placed in "forts d' arrêt," and in works constructed for bridge-heads, because they are the most effective against troops on the march, by whom attempts might be made to capture them by main force. Major Schumann's "eclipse" cupola for a gun of 12 *centimètres* is simple in its construction. It is a balance,† the short arm of which, carries the gun and the armour and the longer one supports a counterpoise. The levelling in direction and elevation takes place in the "eclipse" position, and when the gun has been discharged the recoil makes it descend automatically. The projectiles, to the number of 600, are in a case of sheet iron which is shaped like a book case, and surrounds the room. The roof is formed of two plates of forged iron of 60 *millimètres* each. The gun pivots at its mouth, and can fire at from 1° to over 25° at the rate of one shot per minute. The fault of this cupola is its insufficient thickness. Only four men are required to work the lever, and two for the gun. The Grüson foundry still constructs turrets for quick-firing guns of 55 *millimètres*, but when in the position of firing, the gun, which slides upon a horizontal sledge, has half of its length outside the embrasure. From 10 to 15 shots can be fired per minute, which is equivalent to 800 or 1,200 projectiles. According to the "Metzer Zeitung" of 2nd June 1889, some very satisfactory experiments have taken place at Magdeburg with a rapid firing howitzer of 12 *centimètres*, constructed of cast and forged steel. This gun has no trunnions, but is provided with a handle which, with the help of two grooves, fixes it between the brackets of the carriage. The weight of the gun is 500 *kilogrammes* and it can fire from 12 to 15 shots per minute. It is placed upon an armoured carriage, that is to say, it is protected by a cupola, which rests upon a strong iron plate; the base of the structure being buried in the ground, so that the top of the cupola is alone visible. The vertical field of fire varies from 5° to 35°. The cupola weighs 18,000 *kilogrammes*, and 600 rounds of ammunition can be stored in it. The shrapnel shells for this gun each contain 450 bullets, so that from 5,400 to 6,750 of the latter can be fired in a minute. Two men, who are sheltered behind the armour, are sufficient to work the howitzer. At the last experiments a continued fire of 250 shots was maintained, with the result that the gun was proved to be a success. The range varied up to 2,300 *mètres*, and as many as six rounds or 2,700 bullets were fired in 24 seconds. It is intended to carry out further experiments, with a view to graduating the weight of the charge, so as to obtain a longer range, a higher initial velocity, and a greater penetrative force. The French company of Saint Chamond have lately constructed a turret

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* "Revue Militaire de l' Etranger," Vol. 34, page 675, 1888.

† "Archio für Artillerie und Ingenieur-Offiziere," August 1888, page 368.

for the Roumanian Government,* having an interior diameter of six *mètres*, it is armed with two guns of 155 *millimètres*, and provided with blindages 24 *centimètres* thick. The metal portion is divided into fixed and movable parts, the first of which is composed of segments of cast iron of about 30 *centimètres* mean thickness, forming an exterior coating, the second comprises a piece of sheet iron which supports the carriages and guns, as well as the blindages which protect them, the whole rests upon 12 vertical slides, and is moved by means of ten horizontal ones. The interior crown is rivetted to three large vertical beams, which serve as frames for the carriages, and which, being movable in slides and balanced, can easily give the necessary levelling inclinations for aiming. As regards direction, the aim is obtained by the rotation of the turret itself, which is facilitated by the whole movable portion being supported on the head by a hydraulic piston, which enables it to be raised, so as to diminish the pressure on the carrying slides. A windlass, placed in the lower storey of the foundation, produces the rotation; a complete evolution being easily obtained in one minute. Some smaller windlasses are used to bring up ammunition from below. This turret is the reproduction of the one experimented upon at Bucharest, except that the cylindrical blindages of the latter have been replaced by a spherical cap, 24 *centimètres* thick. The French turret at Bucharest had for its competitor, one constructed at the Grüson foundry, the armament of which, consisted of two Krupp guns of 16 *centimètres*. The two turrets differed chiefly in their interior arrangements; and from the first day those of the Grüson tower exhibited symptoms of weakness, the resisting power of the Saint Chamond plates being found to be decidedly superior, as it was proved that in order to perforate the turret at the level of the embrasures, at least 30 blows of projectiles with bursting charges of 40 *kilogrammes*, arriving with a speed of 500 *mètres*, and striking a portion of the metal, 50 *centimètres* square, were necessary. The above statement should, however, be regarded with caution as coming from a somewhat prejudiced source. The following extracts are from the report on the Bucharest experiments by Major O'Callaghan, R. A., and Captain Clarke, R. E.—"The German cupola consisted of two armoured portions, (1) the glacis plates, consisting of eight cast iron blocks or segments, set in concrete and forming a complete annulus round the pit; (2) the curved shield, free to turn on a central pivot and covering the two muzzle pivoting guns and the mechanism. It consisted of six segmental side plates and a horizontal roof plate; the front plate and those on either side of it were of wrought iron, the remainder were compound. The French turret also consisted of two armoured portions, (1) the glacis plate consisting of four sectors of cast-iron, set in concrete and resting on a brick foundation; (2) the revolving turret, the curved wall of which consisted of three wrought-iron plates. The roof plate was also of wrought-iron, in two semicircular portions morticed together. The turret revolved upon a floating central pivot." "In the German cupola the chamber was well lighted from the back passage and the man-hole at the top, while the lower

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* "L'Avenir Militaire," 5th July 1889.

storey of the French turret was always dependent on artificial light and ventilation." The experiments at Bucharest clearly demonstrated that the edges of the plates were their weak point; and that consequently, it was important to abandon the cylindrical form with its nearly flat roof, and adopt the shape of the spherical cap. Commandant Mougin of the Saint Chamond foundry, acting on the experience thus gained, invented a turret which was experimented upon in 1888 at the camp of Châlons; the interior of which was rendered absolutely proof against the gas produced by the explosion of the melinite.* The turret was pitted against a gun of 155 *millimètres*, a rifled mortar of 27 *centimètres*, and also against a field gun, in order to test the strength of the embrasures; and although the fire was well sustained, the turret suffered so little that it has been proposed to transport it to one of the forts of the first line on the eastern frontier. Only one of its segments had to be changed; the remainder of the turret, including the machinery, only required some minor repairs. An "eclipse" tower, invented by Lieutenant-Colonel Bussière, was experimented upon at the camp of Châlons at the same time. It was a cylindrical turret, which lowered itself entirely after firing, and consequently presented all the faults of this kind of cupola, *viz.*, greater vulnerability of plates, very complicated mechanism, necessitating a machine of 15 horse-power, and a hydraulic counterweight. Its powers of movement were also very slow, (14 to 15 seconds), but it was urged on its behalf that the embrasures were well protected. Commandant Mougin considers that he has now achieved a decided success, as he has arranged the "eclipse," not by an up and down movement following the vertical axis of the turret, but by one from front to rear, and *vice-versâ*, around a horizontal axis which passes through the centre of the sphere, of which the armoured crown forms a part. This movement is effected by hand, when the guns are pointed and loaded: and when discharged, the cupola returns to the "eclipse" position in five seconds. He has thus produced an oscillating "eclipse" turret, for two guns of 15 *centimètres*, a model of which was to be seen at the Paris Exhibition. This method of construction combines some very important results. The shape of a spherical crown is, on the whole, maintained; the experiments at Bucharest and Châlons having demonstrated its value. At the same time, thanks to this form, no change in the appearance of the turret at the moment of its emerging from the "eclipse" position, warns the enemy that fire is going to be opened. The methods of bringing into action, and of returning into the "eclipse" position, are effected by the attraction exercised upon a cylinder, which is fixed on the movable part of the turret by means of two chains working in opposite directions, the extremities of which are, at one end, attached to the aforesaid cylinder, and on the other, to the fixed part of the turret.

This system therefore requires neither steam engine nor hydraulic apparatus of any sort, and it can be worked by six men. The guns do not project beyond the armour, and the obduration being complete, no shell splinters can penetrate into the interior. The guns are entirely under shelter, and are unprovided with carriages, which is an important simplification; their trunnions, moving upon curved slides, describe, at the moment of aiming, an arc of a circle, the centre of which is close to the chase of the piece; the whole of the gun being balanced, this movement, which takes place between 1° below the horizon and 25° above, is effected without difficulty, and the necessary inclination is obtained precisely. As regards the mode of aiming, the rotation of the turret, and the supply of ammunition for the guns, the same methods are adopted in the oscillating "eclipse" turret as in those which have already been described. But the most important point is that the number of men required in the turret has been reduced to six. Lastly, the cost is only half that of the "eclipse" turret which was experimented upon at Châlons*. From the above description, it appears that a turret has now been constructed, which is sufficiently simple not to require any aid from steam engines, and is economical enough to bring its adoption within the bounds of probability. In Germany † some armoured shelters for mortars have been organized, which differ completely from the turrets. They are of two sorts, and vary according to the calibre. Those for mortars of 12 *centimètres* resemble square pits made of masonry, the walls of which are arranged so as to hold 300 projectiles. The roof is formed of two firm horizontal plates of forged iron, each of 6 *centimètres*. There is a round opening, which is filled up entirely by the gun, the latter being movable upon a pivot: a sphere of cast iron is slipped round the mortar, the centre of which is in the plane of the armour; the result being, that whatever may be the angle of fire of the mortar, the interior chamber does not communicate with the outer. The pivot is of wood, and is one *mètre* in height. An iron carriage, shaped thus, **U**, the rounded cheeks of which sustain the spherical part, rests upon the pivot, and can turn 360°. The piece has a vertical field of fire of from 30° to 60°. The shelter for the mortar of 21 *centimètres* is organized on the same principle; the armour, which is of cast iron, being fixed, and the piece alone movable. The remarkable precision of the fire from the cupolas has been fully shown by the experiments at Bucharest. "On the 20th January 1886, the French cupola, after having been subjected to a tremendous fire, executed a rapid fire of 40 shots at a range of 2,500 *mètres*, 25 of which were grouped in a rectangle 10 *mètres* long by half a *mètre* broad. Taking 6° 16′ for the mean value of the angle of fall, this length of 10 *mètres* corresponds, upon a vertical plane, to a height of about one *mètre*. If therefore, the fire had been executed against a target, 62½ per cent of the shots would have been grouped in a space of half a *mètre* square. This result was obtained on a day when the fog was so thick that the observer could only vaguely indicate the points of fall, which were not determined for certain until the next day."‡ The cupolas were also proved to have a considerable power of resistance. The German cupola was attacked, at a range of 1,000 *mètres*, by two Krupp guns of 15 *centimètres* and a Bange gun of 155 *millimètres*, which

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* "L' Avenir Militaire," 30th July 1889.

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* "L'Avenir Militaire." 30th July 1889.

† "Revue Militaire de l'Etranger." Vol. 34, page 677. December 1888.

‡ Brialmont "Influence du tir plongeant et des obus-torpilles sur la fortification."—page 158.

fired projectiles of chilled steel, with a charge of nine *kilogrammes*. It received 170 blows; a surface 65 *centimètres* square on the lower portion being hit 19 or 20 times, without being pierced. A little higher, a surface of 50 *centimètres* square was struck by 14 projectiles; but at the end of the test, the cupola was still able to continue its fire. If artillery fire, carried on without hurry, and under conditions of safety at the butts, is so little destructive, it is probable that a very large number of shots will be necessary in order to perforate a cupola during a siege. The resisting power of cupolas is admitted by Major Clarke, who, on general grounds, is a strong opponent of their adoption. He remarks, with reference to the experiments at Bucharest, that the Saint Chamond turret received 72 hits, the Grüson structure 97, neither being rendered *hors-de-combat*, but he adds * that the attack was practically carried out against the rear plates only, and the armaments of both would have been repeatedly disabled under service conditions. Again, quoting from the official report on the experiments, which was furnished to the Government by himself and Major O'Callaghan, R. A., he says the cost of the French turret was about £10,000, exclusive of its armament; and for this sum about six movable overbank carriages of greater power could be provided. It may fairly be questioned whether the latter would not be a wiser mode of expending such an amount. The *Revue Militaire* proceeds to say that volleys are as little effective as the fire of single guns. A Schumann cupola was attacked at Cummersdorf in 1882, at a range of 1,000 *mètres*, by four guns of 15 *centimètres*, which were fired by means of electricity in order to ensure the discharge being simultaneous. Eleven volleys were fired, but the cupola was never hit by four shots at once. The guns were then moved up to 300 *mètres* and two volleys were fired, which had no effect upon its general appearance. The following experiment may also be noted. Four shots, having a striking velocity of 470 *mètres*, were fired at an iron plate 20 *centimètres* thick, which presented an angle of 30° with the horizontal, which is the angle of incidence given to the curved form of the segment of a turret; after the fourth hit, although they were all on exactly the same place, the depth of the mark produced was only 76 *millimètres*; and, as it is but little probable that in action such a result will ever be attained, it may be concluded that a plate of 200 *millimètres* is practically proof against fire. It should be added, that this striking velocity of 470 *mètres*, means, at a range of 1,000 *mètres*, an initial velocity of 550 *mètres*; which can be obtained up to the present, only by a gun weighing 4,500 *kilogrammes*, which would be difficult to transport readily. The cupolas resist mortar fire equally well. At Cummersdorf some mortars of 21 *centimètres* were discharged at a Schumann cupola, the crown of which was 10 *centimètres* thick in the middle, and 18 *centimètres* at the edges; the range being 1,000 *mètres*. Four shells, fired under an angle of 65°, struck the armour, and hardly left a trace. In 1885, the same cupola successfully resisted the fire of a 21 *centimètre* mortar, firing shell torpedos at a range of from 2,500 to

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* "Proceedings Royal Artillery Institution." Vol. 17, page 223.

3.000 *mètres*. It is probable that these projectiles, not having sufficient force to pierce the metal, broke or rebounded, and exploded in the air. General Brialmont believes that, "a crown of wrought-iron, of from 22 to 24 *centimètres* thick, if the bursting shells cannot strike it under angles of incidence larger than 35°, will resist a great number of shots without splitting, and will only be pierced if struck by 20 or 25 shells on a surface a quarter of a *mètre* square A slightly smaller number of blows would be required if pointed shells were used."* The fact that a cupola, even when pierced, is still effective, and that it is less dangerous to serve in one, even under such circumstances, than to be on an uncovered parapet, must be taken to be proof of admission that the defence is in possession of an engine, which if not perfect or economical, is at least endowed with many admirable qualities. Such is the idea of General Brialmont, whose projects relating to bridge-heads upon the Meuse, of which we will speak presently, include more than 40 turrets constructed to hold one or two guns. The employment of mitrailleuses or of quick-firing guns of small calibre, has led to search being made for some method of protection for these weapons, and Commandant Mougin has invented † a small "eclipse" turret which shelters two light quick-firing guns of 47 *millimètres*; it has the appearance of a sort of sentry box, made of strong sheet iron, which contains the guns, and it is surmounted by a blindage, capable of resisting shells of large calibre. The vertical movement of this sentry box is obtained by means of a pendulum, connected with the interior portion, carrying a counter-weight, which balances the whole of the turret: a single man can easily produce the displacement of this pendulum, and the consequent establishment of the turret in a position of readiness for action or of "eclipse." The duration of the manœuvre is not more than five seconds; a movement of rotation upon slides assures the aim as regards direction being obtained, at the same time that it allows of the apparatus being made use of for the observation of the approaches to the work. Commandant Mougin has also invented an armoured observatory, which is likewise on the "eclipse" system; and which, in its organization, resembles generally the above described turret; being merely reduced in dimensions: its diameter is not more than one *mètre*. It is protected by a blindage which is sufficiently thick to be proof against projectiles of 15 *centimètres*; a single man can keep a look out, and at the same time work the apparatus, and produce, either the movement of "eclipse" or that of rotation. The new conditions of the defence of fortresses render the construction of observatories absolutely necessary, in order that the artillery may be able to take account of and benefit by the effects of its fire; and the system invented by Commandant Mougin appears to have solved this difficult problem in a thoroughly practical manner. The same officer ‡ exhibited a model at the Paris Exhibition of a fort, which consists of an immense monolith of betony, 160 feet long by 60 feet wide, sunk underground, in which are placed all the armaments and stores necessary for the defence. From this block, or platform of betony the upper portion of which is on a level with the ground, emerge at the several angles of the monolith—

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* Brialmont, page 196.

† "L'Avenir Militaire," 9th August 1889.

‡ "L' Avenir Militaire," 9th August 1889; and the "Broad Arrow", 20th October 1888, and 24th August 1889.

1.—An "eclipse" revolving turret, armed with two guns of 15 *centimètres*.

2.—Two turrets for similar guns, constructed for indirect fire.

3.—Four smaller turrets on the same principle, armed with quick-firing guns.

4.—Four steel armoured "eclipse" observatory turrets.

In the centre of the fort, and sunk under a kind of roof, three *mètres* thick, of betony, is a large hall which is intended for the accommodation of the garrison, and in which are placed the compartments for machinery, ammunition, and stores. A garrison of 50 to 60 men is sufficient to work the turrets, guns and machinery. The men enter the fort by means of a gallery about 200 *mètres* long, which is sunk in a sort of well, below the surface of the platform, to which it communicates by a flight of spiral stairs. The outer end of the gallery is fortified by an armoured door, which is defended by two mitrailleuses. The gallery rotates by means of hydraulic pistons with the greatest facility, thus enabling each gun detachment to be changed or reinforced. Exceptional precautions are taken for the lighting and ventilation of the forts. Commandant Mougin's system of defence is completed by railway batteries circulating outside the fort, with guns disappearing somewhat on the Moncrieff principle, and protected by earth-works. The garrison thus have the power of bringing a concentrated fire to bear upon any threatening points of attack. An entrenched camp on the Mougin system would comprise 20 forts, four *kilomètres* apart, a railway, 80 *kilomètres* in circumference, with 500 guns of various calibres, at a cost of 70 million francs, or less than half the expense of similar defensive works under the old method of entrenchment, the estimated cost of a single Mougin fort being 2,500,000 francs, or £100,000; or, according to General Brialmont, 3,000,000 francs, or £120,000.* These forts may be considered as theoretically perfect, but on the other hand, progress in the construction of artillery is by no means at a standstill, and the Krupp foundry has recently manufactured a projectile of 21 *centimètres*, weighing 138 *kilogrammes*, which has an initial velocity of 550 *mètres*. At 116 *mètres* it has pierced armour, which was formed of a steel plate of 40 *centimètres*, of a padding of oak, and of two sheet iron revetments, each having a thickness of two *centimètres*.

This projectile is not yet taken into use for siege parks. At the manœuvres of the VII and X German Army Corps, which took place in Hanover, in September 1889, a new feature in tactics was introduced, in the shape of movable ironclad revolving turrets, each of which was armed with a quick-firing gun, and worked by two men. They are the invention of Major Schumann, and can be transported on wheels, for the purpose either of strengthening a defensive position, or of taking part in an attack; though in their present form, they are a little too unwieldy to be of much use in the latter operation. This defect will however, probably soon be remedied.[*] Major Clarke, who has written with the full knowledge of all the latest developments of the art of fortification, does not believe in the application of the Mougin fort, nor of cupolas generally. He bases his objections, principally on the grounds that a few men, shut up in these forts and cupolas, deprived of the means of seeing what is taking place around them. (except through the small loopholes provided for their guns, which in the case of disappearing cupolas are buried till the moment comes to emerge,) and also being removed from proper control, would lose their nerve, and fire over their enemy's heads: that, in fact, the cupolas would raise themselves prematurely, and disappear when their fire was most needed. On the other hand, he considers that tactical principles and human nature will alone afford a solid basis for systems of fortification; and that organization, capable commanders, efficient armaments, adequate supplies, natural preparations, and well arranged communications, constitute the essence of the defence, and determine the resisting power of land fortification.[†] He is of opinion that the arguments used by General von Sauer and Major Schumann, that, by the mere elaboration of defensive works, or by splitting the garrison into little driblets and putting them behind armour, a great saving of *personnel* may be effected, or that by increased expenditure upon fortification, inferior and half organized troops may safely be employed, are merely specious pleas in vindication of technical extravagances. On the contrary, he contends that if the standard of fortification adopted is such as to render an assault hopeless, which standard is now easily attained, no further elaboration of design and no extravagant employment of armour will enable a reduction of the garrison to be made. The long lines of defence which are necessitated by the conditions of modern war, are responsible for the large garrisons required, and all the cupolas in the world will not enable us to reduce them. The general principles which Major Clarke endeavours to establish are—

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* Brialmont "La fortification du temps présent." page 300.

1. The basis of the defence of a position should be redoubts designed for infantry and machine guns, supported by a powerful artillery, kept altogether outside of them, and supplemented by a field force carrying on the outpost duties and manning field defences guarding the intervals. Thus, unless siege trains are doubled, the artillery combat must be entirely divorced from the attack of the infantry positions; and the besieger, assuming him to have silenced the guns of the defence will then have to recommence action against the redoubts. The latter alone, in conjunction with the field defence of the intervals, will amply suffice to render the position incapable of being taken by assault, while the functions of the defender's artillery will be, 1st to effectually counteract the fire of the besieger preparatory to an assault, and 2nd to delay the operations of a formal siege indefinitely, or to prevent them

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[*] According to "L'Avenir Militaire" of 1st October 1889, these guns are of 37 and 53 *millimètres*; firing shrapnel with effect, at ranges of 3,400 and 5,600 *mètres* respectively. 30 shots can easily be fired in a minute. The turrets can without difficulty be rendered unserviceable if they are in danger of being captured.

[†] "Proceedings Royal Artillery Institution." Vol. 17, page 238. August 1889.

altogether. This arrangement will allow the guns a freedom of action and a choice of sites hitherto denied them, as their own safety is guaranteed by the redoubts and field defences.

2.—The infantry redoubts should be of the simplest form compatible with the fulfilment of the following conditions :—

a. Full development of rifle and machine gun fire.
b. An efficient obstacle.
c. Shelter for the whole garrison, which should not exceed a half battalion, such shelter implying protection against single projectiles only.
d. Unimpeded interior communication, allowing the garrison to man the work in the shortest time.
e. Invisibility.

3.—Full development of fire, by which is implied the abolition of traverses and the employment of machine guns on light carriages which can be rapidly run into position. The employment of field guns on the flanks of a redoubt, the front face or faces being, if necessary, prolonged, and the command of the prolongations being gradually reduced so as to secure the invisibility of the work and avoid masking the flank, the parapets of the prolongations being abandoned before the fire of the flanks come into play. In the absence of a natural back-ground, trees may be planted in rear of the work. Curved traces or well rounded angles should be employed. The command should not exceed 30 feet.

4.—An unclimbable sunk fence and a strong permanent entanglement combined with a parapet "en glacis," with land mines at the foot of the counterscarp, should such be used, would, assuming the invisibility of the work to have been properly secured, render it practically unattackable by artillery fire, and would enable it to be counted upon until the last stages of a formal attack. If it is necessary to use a ditch, it should be narrow; the parapet being sloped as evenly as possible down to the cordon of the escarp, which need not be more than nine feet high. The exterior slope, which should be planted with shrubs, being as flat as possible. An obstacle should be placed on the top of the counterscarp, covered by the glacis. An advance glacis should be employed if the ground permits. The glacis should be planted with trees, which could be felled and form abatis, while the roots and stumps would impede sapping. The bottom of the ditch should be planted. (See different forms of sections of modern field redoubt at the end of this article.)

5.—Casemates should be provided under a parados, or may be in part placed under the front parapet, but all attempts at placing barracks in redoubts should be given up.

6.—The line of parados containing the shelter casemates will follow the front parapet, communications being carefully provided.

7.—In siting the redoubts all idea of securing good artillery positions should be abandoned, the object being merely to select points where purely infantry keeps would be most advantageously posted. An extended field of fire is not essential, and in many cases the site should be drawn back from the brow of the hill. Provided the slope in front can be well observed from some other portion of the line of defence, the artillery will effectually take charge of it, even in the event of a formal attack.

8.—The infantry redoubts will have to be more numerous than the detached forts of approved pattern. The present average intervals are as follows:—

Strasburg	3,540 *mètres.*
Cologne..	3,600 „
Verdun..	4,500 „
Toul	5,000 „
Epinal...	4,500 „

With the intermediate spaces defended by field works, which will be held by a field force, the intervals of the infantry redoubts may be about 2,000 yards, but will depend principally on the conformation of the ground. Where there are good artillery positions falling within the sphere of protection of the infantry keeps, larger intervals will be permissible, and might consist of groups of infantry redoubts, guarding strong artillery positions. The principle of fortification advocated is therefore a greater dispersion of the defence, thus following the analogy of field tactics.

9.—The artillery of the defence should be entirely movable, with the exception of a proportion of heavy howitzers or mortars, constituting the only permanently mounted armament. It should be sought to overpower or exhaust the artillery of the besieger by superior mobility, better observation, and range finding, more highly matured organization, and greater power of tactical surprise, rather than by superiority of shell fire, but full advantage should be taken of the possibility of employing heavy permanently mounted howitzers or mortars in concealed positions.

10.—The guns of the defence having been freed from their ill assorted marriage with the detached forts, the artillery positions may be selected with considerable latitude of judgment. For the direct fire sections of the armament, visual conditions and conformity to the general line of defence impose certain limitations of site, but leave a wide margin of choice. On the other hand, for indirect fire armament, observing stations, which can be held to the last, are the main necessity and there remains a still wider field of selection, more especially since the fortress can employ captive balloons without difficulty, which, with the use of other artificially elevated observing stations, and superior facilities for providing head cover, should give the defence an unquestionable advantage in the effective employment of high angle fire, the accuracy of which depends solely on the results of observation.

11.—The employment of advanced defences of field type, which is now more than ever important, is also more than ever practicable. Thanks to the modern rifle, the self-defence of such outlying positions can be rendered so strong that preliminary siege operations will have to be undertaken against them. They can be utilized as observing stations, by which the scope of action of the indirect fire of the defenders can be widely extended; and they can by this means be provided with powerful artillery support; while, if the high angle armament of the defence is raised to the standard now necessary, their occupation by the besiegers should be almost impracticable, and they may thus be employed without regard to some of the restrictions which formerly existed. This is a distinct tactical advantage, which the defence can derive from a practical recognition of the possibilities of modern high angle fire.

12.—A ceinture railway connecting the redoubts, and at the same time serving as a continuous artillery position for guns mounted on trucks, is an ideal arrangement worth bearing in mind, but frequently impracticable. Railway lines may nevertheless be utilized with great advantage in order to increase the mobility of the heavier portion of the armament. Where the lie of the ground permits, a group of artillery positions may well be thus connected. The guns should be mounted on travelling carriages, capable of being transported on trucks, though special methods of laying the rails would be required to give the necessary strength. With Commandant Mougin's system of a disappearing mounting, this drawback also exists, and if the guns get off the line they would be helpless. On the whole, therefore, it would seem best to use the railway for transporting purposes only, and to lay the line close up to the rear of the emplacement, adjusting the levels so that the gun can be run off and placed in battery in a few minutes. The railway can be laid in the simplest way, and its repairs will be an easy matter.

13.—The best artillery positions for direct fire having been selected, good road communications connecting them with each other and with the interior of the fortress should be made; and, where the ground permits, railway lines should be added, duplicating the principal roads; and in case of a ceinture railway, radiating from the centre of this position. The road or railway, following the general line of the artillery position, should be sunk sufficiently to conceal all movements completely, a thick hedge being a very useful adjunct in securing invisibility.

14.—The front of the artillery positions should be protected by entanglements, and a parapet "en glacis" organized for infantry defence and to be manned by the field force must also be provided in the more exposed portions of the position between or on the flanks of the gun emplacement. This parapet will also assist in covering the lateral lines of communications. Machine guns will be specially valuable in aiding the protection of the artillery position at a great economy of *personnel*. The defence should also be prepared to make a large use of temporary emplacements in the event of attack; the more important ones, as well as the communications, being constructed as part of the permanent defences of the fortress, and the lines of hedge planted.

15.—The indirect fire armament would be mainly kept in the second line, and as a rule need have no other protection than that offered by invisibility and the power of moving along good communications. Concealment would be sufficiently secured by the features of the ground, and by belts of trees. The heavy permanently mounted howitzers or mortars might be posted close in rear, but outside the flanks of the infantry keeps, which would serve as their main observing stations. Belts of trees, planted at 200 or 300 yards in rear of the general line of the position, will not only supply a background both to the infantry redoubts and the artillery positions, immensely enhancing their invisibility, but will effectually conceal the interior. Good communications should be made in these belts, so as not to impede offensive action, and their outer edge can be rapidly prepared for defence, and held by the field force, as a second line if required. In advance of the line of defence trees should be planted wherever they would impede the occupation of ground, which cannot well be embraced from the observing stations, and brought under indirect fire: they might be cut down and entangled. The glacis of all infantry redoubts and of intermediate lines should be similarly prepared.

16.—The main magazine should be placed outside the town, on the radial lines of communication, and behind the line of defence; and concealed as far as possible by natural cover. There should be several magazines, which should correspond to the sections into which the defences are divided for purposes of command. Decentralization should be avoided.

17.—Range finding and observation being vitally important to effective artillery action, good maps and range boards should be provided; and observing stations established in the most suitable positions: cupolas being employed where it is necessary to establish stations in advance of the line of defence. Connection should be established by telephone or dial with the artillery positions.

In the above paragraphs, the case of fortresses, or places of arms, which can be surrounded by a ring of defence, has been dealt with. The general principles will, however, be nearly always applicable, and a decentralization of the defence, the divorce of the artillery positions from the infantry keeps, and a full utilization of high angle fire, should be striven for. In place of a single elaborate and expensive fort, two or three small infantry redoubts, guarding the artillery position, will usually suffice. If the site can be surrounded, so that the garrison is chained to its works, more extensive casemate accommodation will be required. The shallow trace must then be modified, and a continuous ring of obstacles will be needed. Major Clarke, in common with nearly all modern writers, is opposed to General Brialmont's system of retaining a réduit or a permanent enceinte, as he considers that if a line of detached works is once carried, the fortress must inevitably fall. It may here be mentioned that the entrenched camp of Epinal furnishes a case in point, as the town has no fortified enceinte, though preparations have doubtless been made to construct temporary fortifications when required.* Major Clarke sums up his opinion by saying that in the fortification of the future, roads and railways, permitting the free and rapid movement of men, guns, and stores, within the line of defence, must receive a prominent place. Thus will the defence be able to gain, and retain to the last, the power of surprise, not merely in the sense of delivering counter-attacks, but in suddenly and unexpectedly developing a crushing local superiority of artillery fire, from which great results are obtainable.

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*"La prochaine guerre franco-allemande," by Lieutenant-Colonel Koettschau, page 282.

Against such a fire, the besieger will be helpless. To meet it he must alter his plans, redistribute his guns, and start fresh battery building. With a good organization, and good troops, he may perhaps do this in two nights, only to find that the defender has a fresh surprise in store, rendering all his labour useless. The full results attainable by fortress artillery well handled, have never yet been even approximately realized in siege warfare. Major Clarke concludes his article, which coming from an engineer officer may be taken as a remarkable contribution to current literature, and as indicating the direction in which opinion on the subject of fortification is now tending, by strongly urging that the principle of regarding the so called "Modern French" and "Polygonal" systems as the basis of fortication may be abandoned, and that instruction may, in the future, be founded solely on tactical principles, by which means alone, can the subject of fortification be brought into unison with the requirements of the present day.

It is apparent that the artillery fight is of the utmost importance, and the side which emerges from it successfully will be almost certain to be the victor in the ensuing operations. It is also evident that artillery shut up in forts which can be enveloped by a superior force of the same arm and subjected to a convergent fire must speedily be silenced, as the divergent fire of the small number of pieces which constitute the armament of each fort becomes powerless against the greatly superior fire brought to bear on them by the enemy. This fact was recognized by General Cosseron de Villenoisy in a brochure entitled, "Quelques réflexions sur les méthodes à suivre pour l' attaque et la défense des places fortes," * which was published in 1882, in which he points out the fact which is now almost universally recognized that the only possible remedy for such a state of affairs lies in the employment of auxiliary batteries, and thoroughly good communications so as to enable the defender to carry on an offensive action from the very first. The dispersion of guns and the concentration of their fire on particular points are, says this writer, the main principles of the tactical conduct of the defence, in addition to which, other auxiliary measures, such as the lighting up and exposure of the field of attack, the disposition of rifle pits and torpedoes, the execution of counter-attacks, &c., must not be neglected. The best method of obtaining such a dispersion of guns as to enable the besieged to cope with his assailant on equal terms, is to extend the radius of the line of defensive works, which should consist of powerful infantry redoubts combined with a movable artillery, on the system advocated by Major Clarke. General Brialmont in "La fortification du temps présent" shews the importance of occupying a position about seven or eight *kilomètres* in front of the line of forts, from whence the enemy's flanks could be threatened on his advance to surround the place. The necessity of strongly disputing the approach of the assailant is recognized in Germany. "When a place is threatened with a siege an advanced position must be organized from whence its artillery can first reach the enemy's columns at a long distance and then disturb them in their preparations for the investment, assist the infantry in the defence of the advanced terrain and finally protect the forts and their intervals against attacks."* It is stated that the Germans, acting probably on this system, have entirely remodelled the armament of Metz, Strasburg and Cologne, and have substituted a large number of quick-firing guns and pieces of mean calibre for the heavy guns previously in use. † It has been shewn that the theories of Major Schumann, General von Sauer and Commandant Mougin are by no means universally adopted. General Brialmont remarks that "a truth which the new school does not take into account is that the fundamental principles of fortification are as invariable as those of strategy. The progress of the armament and of tactics only exercise influence according to the manner in which these principles are applied.‡

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* "Proceedings Royal Artillery Institution," Vol. 17, page 297, 1889.

The same author in his recently published book "Les Régions fortifiées"|| insists strongly on the fact that the superiority of the defence has increased with the power of the means of destruction, principally owing to the invention of range boards and armoured turrets, in which he is a firm believer, and to the extension of the lines of defence. He believes that places with flanked ditches, provided with a sufficient number of cupolas and bomb-proof shelters, suitably provisioned and defended by good troops, will oppose to the besieger difficulties and even impossibilities such as history has not yet afforded an example of. There is, as has already been shewn, a remarkable divergence of opinion on all the points above referred to. As regards the employment of cupolas the report on the Bucharest experiments states that "against the direct frontal fire of high velocity guns the cupola appears to afford no increase of protection commensurate with its cost. Against curved fire and flank fire the gain of security is considerable. If a horizontal shield capable of providing protection against the projectiles of the heaviest siege howitzers could be provided for the pits of disappearing guns, this system would seem to be preferable to any land service cupolas at present devised. The main point of weakness, the opening through which the gun is raised and lowered, is perhaps more than counterbalanced by the absence of a well defined and always visible target." And again, we read that "a disappearing gun in a well placed pit, provided with a horizontal splinter-proof shield, is far better protected than in an impenetrable turret."¶ General Wiege in a brochure recently published, examines the arguments for and against the employment of cupolas in a very impartial manner.§ He is of opinion that while their undue use is certainly to be deprecated, their employment is necessary—

1*st.*—In important posts, completely isolated or separated from the principal position of the defence, which are exposed to enveloping attacks.

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* "Jahrbücher für die deutsche Armee und Marine." November 1889.

† "L'Avenir Militaire," 17th December 1889.

‡ "Influence du tir plongeant et des obus-torpilles sur la fortification." 1886.

|| "L' Avenir Militaire." 3rd January 1890.

¶ "Protection of Heavy Guns for Coast Defence by Captain Clarke, R. E., Proceedings Royal Artillery Institution," Vol. 15, page 183.

§ "Revue Militaire de l' Etranger," Vol. 36, page 705, December 1889.

2nd.—In parts of a large fortress which it may be necessary to defend for some time with a few guns, either because they prevent the approach of the assailant, or because they occupy good positions for commanding the important lines of communication, or for taking the enemy's batteries in flank.

3rd.—For the protection of guns intended for flanking purposes, or to act during the last period of the siege, *viz.*, from the end of the artillery combat until the assault of the breach.

All pieces of ordnance which do not come under either of the above headings should, according to General Wiege, have no armour protection, as he considers that they take up more room and are more expensive than if they had no bomb-proof cover. and consequently fewer of them could be employed upon a single exposed front; while their replacement if injured, would be more difficult to carry out. He also considers it probable that however well organized a place may be, it is quite possible that the cupolas might not be placed in the positions where they would be most required; which would be a serious defect, as it would be impossible, as a rule, to move them. General Wiege is a strong advocate of the system of using rails to facilitate the transport of heavy guns, which will, he says, give the defence a considerable advantage over the attack. This system has also many upholders in Russia.

Reference having been made to the Meuse forts for the defence of Belgium, a short consideration of General Brialmont's proposals may not be out of place. The question as to the probability of an advance being made by Germany through Belgium for the purpose of attacking France, or *vice versâ*, embraces too large a subject to be discussed in this paper at any length; suffice it to say, it has been considered that unless Belgium took steps to defend her territory, Germany might adopt one of the several lines of invasion leading through that country upon Paris, of which that of the Meuse, the Sambre, and the Oise, is perhaps the most feasible. Several German railways converge upon Aix-la-Chapelle, but only one line, a double one, actually crosses the Belgian frontier, though it branches afterwards in suitable directions for concentrating troops on the northern frontier of France. It is unlikely that the advantages offered by this line of invasion, separated as it would be by Luxemburg and the Eifel range of mountains from operations taking place on the eastern frontier of France, would be held to be sufficiently tempting to make Germany renounce those which she undoubtedly possesses in the powers of mobilization and concentration which are afforded by the capabilities of her railway system; which combined with the possession of Metz, would point to the theatre of action being Alsace and Lorraine, rather than Belgium: but operations by the latter route are within the bounds of possibility. It also might occur that, as the French have lost the points of concentration used by them in 1870, *viz.*, Metz and Strasburg; they might be tempted to utilize the strategic advantages which their northern railway system affords; and push rapidly through Belgium for the purpose of endeavouring to force the passage of the northern Rhine near Cologne. In either case the Belgian army, which amounts only to about 100,000 men, would have been forced, up to the present, to fall back on the fortifications of Antwerp, as the rest of the country was practically open. In 1887, however, 8,000,000 francs,* were laid aside for the purpose of improving the forts of the Meuse. At Liège, 6 large and 6 small forts were ordered to be constructed, at Namur the citadel was retained, but the new fortifications comprise 5 large and 4 small forts, which are to be supplemented by redoubts when the time for action arrives. At Huy an old fort will be improved. The *tête-de-pont* of Liège will cover 10 bridges over the Meuse, will command two others, and also ten railways. That of Namur will cover three bridges over the Meuse, and command two others, and six lines of railway. The post of Huy will command two lines of railway and cover two bridges. The remaining bridges will be mined. The garrison of each large fort will comprise one company of infantry and one battery of artillery, 450 men in all. The armament will be nine cupolas, some with two guns of 15 *centimètres*, the others with a howitzer and a quick-firing gun. The ditches will have revetted counterscarps; some of the forts will have their counterscarps cut out of the rock, the ditches being flanked by quick-firing Nordenfeldt guns, which can fire 3C rounds a minute: each round containing 153 bullets, or 4,590 rounds a minute. Each small fort will be garrisoned by 200 men, and its armament will consist of 5 cupolas, organized similarly to those of the large forts. There will be an interval of 4 *kilomètres* between the forts, which will be at a distance of 7 *kilomètres* from the towns. Entrenched camps are not intended, only *têtes-de-ponts*, which will give more liberty to the field armies by ensuring the command of the passages of the Meuse: and as rapidity of action would form a main element of success, it is now more than ever probable that Belgian territory will for that reason, if for no other, be held to be neutral, in case of war breaking out between her powerful neighbours.

The French "forts d'arret" on the eastern frontier, constructed according to General Rivière's system of defence, have a polygonal trace with bastioned gorge, a parapet eight *mètres* thick, and six to seven *mètres* high, with a ditch which is usually dry, a little more than 10 *mètres* wide, and the same in depth. A covered way five *mètres* thick and about two *mètres* high, provided with "places d' armes" and traverses, covers the escarp, which is either scarped out of the rock or is in the form of a detached wall, from indirect fire. Caponniers at the salients, with two guns on each flank, combined with counterscarp galleries, defend the ditch. The forts are armed with ten to twenty 15·5 *centimètre* (=6·1 inch) and 21 *centimètre* (=8·3 inch) guns, protected by traverses, or mounted in armoured casemates and cupolas. In the larger forts, a cavalier gives a second tier of fire, and most of the forts have a revolving turret, for one or more guns, at the most exposed salient. The armament for close fighting, is composed exclusively of

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* "Revue Militaire de l' Etranger." Nos. 688 and 690.

12 *centimètre* (= 4·7 inch) guns. The garrison consists of, from two to four companies on a war footing. The forts are well adapted to the configuration of the terrain, and wherever there are folds of ground which cannot be commanded from the ramparts, special batteries are established for the purpose, sometimes at a considerable distance from the main works. Near the greater number of the forts, and within easy range of infantry fire, are artillery emplacements ("batteries annexes"), which are ready for the reception of a large number of guns. The communications to the interior of the works, as well as the roads leading into the country, are well protected; and the several forts are connected by roads and railways.* It is contemplated to replace some of these forts by those of the type invented by Commandant Mougin, of which a full description has been given. In the new forts near Paris there are Moncrieff emplacements at the corners, the remainder of the guns are in cavaliers and are thus hidden from view. The front parapets are reserved for musketry fire. General Brialmont's proposals for the fortification of the entrenched camp at Bucharest were that the main defence was to consist of 18 large forts, at about 4,000 *mètres* interval, supplemented by intermediate batteries. The forts were to have earth scarps and a detached wall flanked by counterscarp galleries, with three embrasures, two firing in front and one behind the wall. The counterscarps were to have arched counterforts. The detached wall was to be protected from projectiles grazing the crest of the glacis with a descent of 1 in 3. On the flanks it was considered that the wall would be sufficiently protected if it could not be hit at an angle exceeding 45 degrees. In front there would be a second glacis, covering wire entanglements and other obstacles, and on the flanks, wing batteries and rifle trenches would be provided. The parapets were to be constructed of sand with a layer of vegetable mould on the top, the exterior slope being about $\frac{2}{3}$. An interior réduit would contain three turrets or cupolas and a battery for four howitzers. The latter were to have central pivots and hydraulic buffers. Between each adjacent pair there would be a hollow traverse capable of containing the howitzer, and at the back of the chamber there would be a small ammunition store.† It may here be mentioned that the frontier fortresses of France, Germany, Russian Poland and Galicia, are plentifully supplied with cupolas, most of which are on the Grüson system.

Rapidly executed attacks on fortresses (attaques brusquées).

The assault, after previous siege operations‡ has always been regarded as one of the means of reducing a fortress; and it has hitherto been looked upon as the principal method whereby the duration of a siege may be shortened, but the tendency of the present day in favour of bringing all operations of war to an end with as little delay as possible, has brought into prominence the idea of substituting for former methods, the rapidly executed or sudden attack: and doubtless the idea of being able to seize a fortress provided with detached forts, without having to unite and place in position a large number of heavy siege guns, or to render a large force comparatively useless for a long time, while slow and tedious operations are being carried out, is decidedly attractive from many points of view: and it has found many advocates in Germany, of whom the best known is perhaps General von Sauer, who is a firm believer in the theory that a fortress is capable of making but a feeble resistance, if opposed to an adversary who knows how best to utilize the forces at his disposal, and the powerful means of destruction which modern artillery supplies. According to these writers, everything is in favour of making full use of rapidly executed attacks, which should lead to the fall of the place with less delay, and perhaps with more certainty, than the methods formerly in vogue.* General von Sauer is of opinion that detached forts, established at considerable distances from each other, and from the central fortress, constitute a line of defence which is by no means invulnerable; and that the assailants will triumph with ease, if they act rapidly, and with all their forces upon the whole extent of the perimeter of the place; avoiding attacks upon particular points, but leaving the defenders no rest until they have carried the enceinte of the town itself. Once commenced, the attack should be carried through without intermission. The assailants will not attempt to seize any "points d' appui," but will content themselves with reducing them to silence; after which, they will throw themselves upon the intervals, where the defenders, still occupied with their organization, and surprised by such a sudden irruption, would probably offer but a feeble resistance, which could be easily overcome. It is admitted on all sides, that with new arms, new tactics have become necessary; and there is no apparent reason why this rule should not hold good in fortress warfare, in which the attack now possesses great advantages in the efficiency of plunging fire, and the mobility of siege guns. If it is possible to harass the defenders in every direction by means of field artillery, combined with a certain number of easily transportable siege guns, the besiegers will no longer be compelled to fight on a limited space, where the adversary will not fail to accumulate all his powers of resistance; but they will be free to select their points of attack, and to multiply them to as great an extent as they think fit. This extension will divide the defenders' forces, who being thus compelled to confront their opponents on every side at the same time, will, it is believed, soon succumb under the unequal struggle. This result being obtained, full advantage should be taken of it by pursuing the attack without intermission, so as not to allow the enemy time to organize his forces, the possibility of which is one of the chief drawbacks to the regular siege.† General von Sauer is convinced that these rapidly executed attacks will suffice for the reduction of the greater number of fortresses; and he only admits as exceptions, those whose organization is in conformity with his own ideas of having the advanced perimeter protected by lines of turrets. With all other dispositions, the vulnerable parts are the intervals which separate the "points d' appui," and if they can be overpowered from a distance by the guns which the assailant would have at his disposal, it would follow, that besides the garrison of the central fortress itself, only the batteries, and the works which would have been rapidly executed at the outbreak of hostilities, would remain to be reckoned with, and it could hardly be expected that they could have been thrown up on all the points which would be exposed to attacks of this sort; and under such circumstances, the troops of the defending force will certainly be insufficient to oppose an adversary, superior in numbers, and flushed with success. It must be remarked, however, that an enterprize of this nature demands a large number of troops, and a numerous, if not powerful artillery. Besides, in order to enable the attacks in several directions to be carried out simultaneously, it would be necessary that the investment should be complete, and that all the guns and ammunition should be well up to the front; but these convoys would often have long détours to make, and good and practicable roads might not always be available. "In sieges of large fortresses, the assailant never knows beforehand what amount of resistance the enemy is capable of making. Steps must invariably be taken to maintain the supply of ammunition to such an extent that the fire should not only never be interrupted, but should even increase in power. Any such interruption, even if it were only for a single day, would be of advantage to the defender, who would certainly find means of repairing the damage caused by the bombardment, of mounting fresh guns, of destroying his opponents' artillery, and of re-occupying with his infantry the outer positions which he had been forced to abandon. The assailant would then have to re-commence his operations afresh."* The ultimate success of the rapidly executed attack is only possible after the artillery of the defence has been overpowered, but General Brialmont contends that "General von Sauer has too high an opinion of the power of the batteries of the attack, and that he believes too much in the inferiority of those of the defence."† When this favourable hypothesis is not realized, the attack on the intervals will be difficult to carry out. There will always be some guns which, in spite of all efforts, will not be reduced to silence, and it is therefore probable that the assailant will often find himself in a very critical position, and may be exposed even to a complete defeat. Major Clarke, referring to the writers who advocate the attack being carried out by the means now under consideration, says, "there is nothing in military history to bear out the views of this school: and modern experience is entirely against them. Only one such attempt was made in 1870-71, against the highly indifferent provisional works of Belfort, and this failed completely."‡ Major Lo Forte of the Italian Engineers,|| considers it improbable that the besieger would

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* "La prochaine guerre, franco-allemande," by Lieut.-Colonel Koettschau, page 284—287.

† "Report on the experiments at Bucharest," by Major O'Callaghan, R. A., and Captain Clarke, R. E.

‡ "Revue Militaire de l' Etranger." Vol. 35, page 596, 1889.

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* "Ueber den Abgekurzten Angriff gegen feste Plätze, und seine Abwehr." Berlin, 1889.

† "Ueber Angriff und Verthirdigung fester Plätze."

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* "Ideen über Befestigungen." K. H. Berlin, 1888.

† "Influence du tir plongeant et des obus-torpilles sur la fortification."

‡ "Proceedings Royal Artillery Institution." Vol. 17, page 237.

|| "Rivista di artiglieria e genio." 1888.

attempt to force an interval without having first carried the collateral forts, and installed himself solidly therein. It would, he says, be an act of folly to fight on the sector comprised between two forts and the central enceinte, as this ground would be exposed in every way, not only to their fire, but also to that of the other works which would have been organized to form an intermediate line of defence. General von Sauer lays great stress upon a careful reconnaissance being made of the fortress before the attack is attempted, which, while affording information of the dispositions of the enemy, should allow nothing to transpire of the intentions of the assailant. It is also most important that the besieger should obtain full information as to the number and state of the roads in the vicinity, especially of those leading to positions, unseen by the defenders, from whence the artillery of the latter can be counter-battered, and to ground, favourable to the establishment at about 2,000 *mètres* from the detached works, of howitzer batteries, whose powerful action will render possible the attack on the first line of defence. As much information as possible, should also be obtained respecting the works and observatories constructed by the defenders, and the number and nature of their guns, for which purpose, as well as to prevent the enemy from finding out in what manner, and from what directions the attack will be carried out, numerous demonstrations should be made, which will keep the defenders in a state of indecision. During the reconnaissance, the communications of the fortress with the exterior will be cut, and the several columns will effect their junction, still keeping out of view of the defenders; whilst a number of small artillery and engineer parks will be established instead of the ordinary two large parks, which would now only be constituted in cases where it is considered necessary to deceive the enemy, and to make him believe that the attack is to be carried out in one or two particular directions. These preparations concluded, the assailant should gain by a concentric march the positions where the batteries will be established which are to prepare the way for the attack on the intervals. It will be necessary to advance and debouch almost simultaneously on all sides, or at least on those which peculiar circumstances do not render unapproachable; and the attacks should be followed up without any delay until the assailant has gained possession of the ground in front of the detached works, so as to enable him to establish at about 2,000 *mètres* distance from them the movable batteries which are intended to bombard the first line of defence. The advance to this position may be executed during the night, but it is essential that the batteries should be constructed in sufficient time to enable the guns to open fire at day-break on the following morning. The first phase of the attack may now be said to be concluded, as it would not be possible to impose any further task on the troops without first allowing them to rest. General von Sauer considers that every attempt made by the garrison to advance beyond their line of defence will be favourable to the assailant, who will endeavour to draw the defender as far away as possible, so that he may be able to fight and crush him upon ground which has not been prepared beforehand for defence; but he will at the same time take care not to allow his troops to be drawn under the fire of the fortress prematurely, and so expose them to useless loss. General von Sauer takes as an example, a fortress having a perimeter of 60 *kilomètres*, which he proposes to attack with two army corps. Out of these 60 *kilomètres*, 12 may be looked upon as unapproachable, in which case eight attacking columns might be easily formed, each consisting of a brigade of infantry with the necessary reserves. The attacking troops would thus be in the proportion of one rifle to every running *mètre* of the line of defence, not including reserves, so that a brigade would cover 6 *kilomètres* exactly. As the two army corps (German) could dispose of 32 to 36 batteries, each of 6 guns, each attacking column would have 4 or 5 batteries; and if a regiment (two battalions) of foot artillery were added for each corps, each column would have a half battalion, with 12 movable siege guns; and if this were not considered sufficient, a whole battalion of foot artillery, with 24 siege guns might be apportioned to each column, which would entail 5 movable parks, each of 40 guns.* There is nothing definite in the figures referred to, which are only given in order that an approximate idea might be formed of the force required, which would be either more or less according to circumstances. It is doubtful whether the numerical superiority of the assailant would be sufficient to produce the expected result, or if the ground which separates the positions occupied by the defender's outposts from those taken up by the batteries destined to fire against the line of works, will be abandoned by the defence as soon as the assailants show themselves. The author of "Ideen über Befestigungen" contends that the defender will endeavour to dispute, as far as possible, the assailant's advance; and that the operations of a siege will always be preceded by combats, fought at some distance from the fortress, in which the advantage is, from the commencement, on the side of the defender, who is better able to concentrate his artillery, which should be able to hold that of the assailant in check, at any rate for some time; and this will enable the defender to organize and make his dispositions, with a view to the expected artillery fight. He will therefore, only evacuate the ground bit by bit; and although he will not be able to resist indefinitely, all his efforts will tend to delay, as far as possible, the opening of fire by the hostile batteries; and this circumstance is certain to influence considerably the progress of the operations. It is recognized by General von Sauer that unless the attack has succeeded in gaining a superiority of fire, especially of artillery, so as to be able seriously to shake the *morale* of the enemy, considerable losses are certain to be incurred by the assailants in making the attack; to oppose which the defender will have at his disposal, the artillery of the forts and of the intermediate works, as well as that of the improvised emplacements which will have been constructed during the period of mobilization of the place, in the intervals between the permanent works. There will also be the heavy guns of the annexed batteries, "anschluss batterien", which are situated outside the ditch, as well as other arrangements which may have been prepared by the defenders. Each permanent work will contain from six to eight guns, and each annexed battery from eight to ten pieces of ordnance, a certain number of which will be howitzers. In reality, each interval will be only defended by two half works and by two annexed batteries; the intermediate work, when it exists, will be provided with six light guns, of which two, or at most four, can act against the assailant, making a total of 28 to 32 pieces of ordnance, to which must be added upon each front, a supplementary battery of six guns, to which the assailant will oppose the 24 to 30 field guns of the attacking brigade, and the 12 to 24 siege guns which will be attached to it. Under such conditions General von Sauer considers that it would be easy for the assailant to obtain the necessary superiority of artillery fire. The number of guns would not, according to his views, be the only element in favour of the besieger, as he can, by a judicious employment of his artillery, triumph over his adversary when the latter is not sheltered by armour. The best means of obtaining this result is by making use of plunging fire, which, however, certainly cannot be counted upon to effect any considerable amount of damage at a range beyond 2,000 *mètres* upon such small objects as the batteries; but it is probable that, either by a night march, or by making use of the accidents of the ground, an advance may be accomplished to within a suitable distance, in which case General von Sauer is of opinion that the destruction of the enemy's artillery will be very soon effected. Should circumstances not be favourable, the attacking artillery will make use of long range shrapnel fire, so as to render it difficult, if not impossible to serve the batteries of the defence; and will thus prevent them from seriously opposing the approach of the attacking troops. The distant fight of artillery will, as is generally admitted, terminate disadvantageously to the defender, but as several military writers have observed, this result may not be obtained with the desired rapidity. If the artillery of the fortress is, in some parts of the field inferior in numbers, it will, on the other hand, possess the advantage of knowing the ground; and its dispositions, in case of attack, will have been made beforehand; it will also have at its disposal better means of observation than the adversary,* whilst as regards its fire, it will be generally considered that General Brialmont is in the right when he says that "it is impossible to admit, with General von Sauer, that the light pieces of the attack can fire shrapnel with effect against the works without having anything to fear from the heavy guns which constitute the armament of the defence."† Everything tends to show that the superiority of fire will not always be attained by the assailant at the commencement of the fight, but it is beyond doubt that, sooner or later, he will acquire it, and as soon as that result is obtained, the attacking troops will be enabled to advance towards the emplacements, where they will establish the howitzer batteries which are intended to render untenable the installations of the defence in the line of detached works or in its vicinity. The infantry of the attack will advance upon the intervals which separate the detached forts, rather than upon the works themselves, which would be more capable of offering a stubborn resistance. (The possibility of this has been disputed, as we have before seen.) The advance will be carried out under cover of the artillery, full advantage being taken of the accidents of ground, and of information obtained by means of reconnaissances. The attacking infantry must always be numerically superior to that of the defence. In the foregoing example a larger general reserve than one division could not be counted upon for the defence, and the general in command would be at a loss to decide how to use it to the best advantage against the eight attacking brigades. General von Sauer says that it will be comparatively easy to overcome the resistance of the defenders because the intervention of the artillery of the fortress is only to be dreaded whilst the opposing forces are at a distance from each other. Rapidity of action is therefore a condition of success, wherever the contending forces are not actually engaged, and in cases where the guns of the defence have not been reduced to silence. The forward movement should not, however, at this period, be pushed too far, nor should the assault of the line of "points d' appui" be at once carried out, but the assailant should be content with establishing himself as strongly as possible on the ground he has won. During the night, preparations must be made for the decisive action of the morrow, and the enemy must be kept in a continual state of alarm by means of troops who are not destined to take part in the actual assault. It has been doubted whether the advance could succeed if a considerable number of the guns of the defence were protected by armour,* but General von Sauer is of the contrary opinion, though he thinks that in such a case, an advance by night might be advisable. He remarks that it is not so easy to fire under armour as behind parapets, and that direct fire, which must be employed against the attacking troops, is especially difficult to carry out when within range of shrapnel. The fire of guns in turrets is, he says, rarely efficacious beyond a range of 5,000 *mètres*, so that there could only be a dangerous zone of 2,000 *mètres* to cross, before the shrapnel fire of the assailants could be brought to bear on the defenders. He is further of opinion that even if the armoured guns cannot be then put out of action, their effect, as well as that of the pieces of ordnance intended for the artillery fight, would not be sufficient to stop a well conducted advance, especially where the ground is favourable. On the whole, the advance thus far, can and should succeed. It will terminate in the conquest of positions favourable to the establishment of howitzer batteries, but it is necessary to take into account the time necessary for this operation. The success of the assailants depends, to a great extent, on their numerical superiority †, and this becomes a serious difficulty when it is considered that their troops are widely spread, and that the positions have been prepared beforehand. In face of an unbroken adversary the difficulties will be numerous and serious, and if the defender is not wanting in energy, it appears doubtful if success can be obtained, save at the cost of heavy loss.

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* A British army corps would dispose of 14 batteries, each of 6 guns. If a cavalry division were also present two additional horse artillery batteries would be available. Similarly, a German infantry brigade consists of at least 6 battalions, while a British brigade would have but four.

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* "Ideen über Befestigungen."

† "Influence du tir plongeant, et des obus-torpilles sur la fortification."

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* "Fortification du temps présent," and "Influence du tir plongeant et des obus-torpilles sur la fortification." Brialmont.

† "Ueber den Sauer'schen Angriff gegen feste Plätze."

The several operations studied up to the present, would have been conducted with the view of preparing for the principal act, *viz.*, the assault on the line of detached works, the intervals between which, being once forced, it is believed that the "points d'appui" would surrender without further trouble, or that, at any rate, they would be incapable of opposing the further march of the assailant.* During the night the attacking troops would have secured some rest; and the batteries for plunging fire would have been constructed so as to be in readiness to open fire at daybreak, but General von Sauer is at a loss to know upon what object. The defender's guns would, he says, already have suffered severely, and could make but little resistance to the plunging fire of the attack. Besides, in considering the attack on an interval, the only guns which would command the ground over which the advance would take place, are those in the flanks of the detached works, and those in the intermediate batteries; and their fire would have to be well directed in order to avoid causing injury to their own troops. As the advance progresses, the fire from the works, and the annexed batteries will become less formidable, while the artillery emplacements established near the line of defence, will be unable to offer more than a feeble resistance to assault. The security of the intervals could, therefore, only be obtained by means of strong bodies of infantry. The garrison of the fortress under consideration might consist of 60,000 men. But supposing that each of the detached works was occupied by a battalion, and each of the intermediate batteries by half a battalion, and that, in a line of 60 *kilomètres*, there were twelve of each description of work; that 2,000 men occupied the central position, and that a brigade was held in reserve; there would remain at most, exclusive of casualties, 4,000 men for the defence of each of the threatened intervals; to which would be opposed from 6,000 to 8,000 men, besides reserves. The defender is always forced to divide his forces, and this would be more than ever necessary when the attack is conducted according to the method now under consideration; so that he would labour under a serious disadvantage. The possession of interior lines is, it is urged, only advantageous when but one point is threatened, and becomes valueless when the attack takes place on several sides at once. General von Sauer does not believe that the fortifications will materially increase the power of resistance of the defenders' troops, as the latter will be so exposed on the parapets that they will be paralysed or destroyed, before the shelter behind which they have taken refuge has been demolished. In fact, he considers† that this demolition is completely useless, and will not usually be attempted. It is no doubt true that the principal cause of failure of certain assaults which were repulsed by rapid musketry fire was that the artillery preparation was very insufficient. This was especially the case at Plevna, where the Turks, seated at the foot of the interior slope of their entrenchments, defied the uncurved fire of the Russian artillery; and when the attacking infantry had approached to within a few hundred yards, so that their artillery was compelled to cease firing, the defenders arose, and directed a very heavy infantry fire, at a short range, upon the assailants. Lieutenant Greene, however, states that in his opinion " the Russians were defeated, not because the position was impregnable, nor because they had not sufficient troops, but because they were ignorant of the enemy's position, and failed to concentrate their efforts upon the decisive points. "* Contrast the result in this case with that of the battle of Aladja Dagh, where the Russian artillery being properly served, the Turks became so demoralized by the shrapnel fire that they abandoned their trenches on the approach of the Russian infantry, having lost between 4,000 and 5,000 men.† General von Sauer considers it certain that in future, the defenders will not be able to remain upon the banquette of a parapet, owing to the effects of curved fire, but they will be forced to await the adversary in their bomb-proof shelters from which they can only come out a short time before the successful assault takes place." The application of these principles will not, according to the same authority, present any difficulties. The attacking artillery will open fire at daylight with curved fire, upon all the works, and upon anything likely to oppose the advance; and when, owing to this bombardment, the gunners and infantry of the defence have been forced to take shelter, the assailants will advance as far as the exterior limit of the zone of infantry fire. At this moment the artillery of the attack must cease its fire, whereupon the garrison will re-occupy the parapets. As soon as this is observed, the curved fire is re-commenced with the utmost vigour, so as to drive the defenders again from the ramparts. This plan, being repeated a few times, would have the effect of exhausting the defending troops, who, even when the artillery fire ceases, will not venture again to expose themselves, but will remain paralysed by the fear of its renewal, under the shelter of their casemates. The assailants will now prepare for the assault by reconnoitring the ground over which they must pass, and by destroying the accessory defences which have been placed thereon; the artillery, in the meantime, continuing its fire upon the works.

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* "Revue Militaire de l' Etranger." Vol. 35, page 733, June 1889.

† "Die Befestigungkunst der Gegenvart. Besprochen vom General Major von Sauer Jahrbücher fur die deutsche Armee und marine." January and February 1886.

The ground having been cleared, the columns will advance to within a distance of about 300 *mètres* of the line of works, when the artillery will again cease its fire. If the adversary rushes to the parapets he will once more be crushed under the heaviest fire possible, but if he quits the banquettes there need be no further renewal of this fire but the assault can at once take place. General von Sauer believes that, by the use of such simple tactics as those above described, the final success of an attack on the line of detached works need not be a matter of doubt and even if it failed, the danger would not be very great, as the assailants would only have to rally as quickly as possible, at a distance of

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* "The Russian army and its campaigns in Turkey, 1877-78", by Lieutenant Greene, U. S. A.

† *Ibid*, page 396.

200 to 300 *mètres* from the position, when the plunging artillery fire could be recommenced. He considers that armoured guns, placed in the works, would be unable to delay the operations, as the distant field batteries would already have caused some confusion amongst them, and have rendered their aiming a matter of difficulty. Some pieces of ordnance of medium calibre, would then advance and discharge projectiles having a high initial velocity. In order to disable guns which are protected by armour, particularly good practice is necessary; and to obtain this, an advance must be made during the night, so as to establish the guns within 1,000 *mètres* of the object; but should this be impossible, the assailant must be content with keeping up a fire at a longer distance, which, however, will necessitate the use of a larger number of projectiles. It might happen, especially in the earlier constructed cupolas, that the gas produced by the explosion of the shells having bursting charges, would penetrate into the turrets and disable the gunners. As the shells which strike the concrete ring and the upper part of the glacis plate will probably be numerous, and as explosions will consequently take place in the open space between the armour and the glacis plate, it is necessary to prevent the gas from penetrating into the outer passage of the cupola, and so endangering the lives of the gunners and workmen. "It is not impossible," says General Brialmont, "to guard against this inconvenience, and to prevent by special means the introduction of gas, either by the space which separates the cupola from its glacis plate, or by the man-hole." Experiments with this end in view, were carried out at Malmaison and St. Cyr, the results of which were completely successful,* and the experience thus gained was turned to account, as we have seen † in the Chalons turret of 1888, which was a matter of the greatest importance, as, should such an event happen, and a projectile were actually to penetrate into a turret through the man-hole, the result would undoubtedly be the destruction of the garrison as well as of the guns. It would probably be but seldom that such an accident could occur, nor would it be possible to count with certainty upon being able to place heavy mortars in position during the night which precedes the attack. From what has been before stated, it appears, that with regard to the phases of the attack preparatory to the assault upon the line of works, General von Sauer counts upon a too rapid success; while the result of the assault itself is even more doubtful. The assailant will probably be able to obtain possession of the ground situated in advance of the line of detached works, though doubtless at the cost of heavy loss. But during this period it is improbable that the defender would not find time to complete, at least upon the most vulnerable points, his preparations for defence; in which case the assailant must have recourse to a regular artillery combat in order to reduce the fire of the fortress. The "points d' appui" are not intended, in the majority of cases, to take part in the artillery fight; and every precaution will certainly have been taken, to enable them to play their true *rôle* to the greatest advantage.‡

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* "L' Avenir Militaire," 30th July 1889. | † *Ante*, page 127.

‡ "Landesbefestigung" by Lieut.-Colonel Heyde, Prussian Engineers.

They may, however, contain some guns which may be unprovided with bomb-proof shelter, the service of which will certainly be rendered impossible. But it is improbable that the same result will be obtained as regards the annexed and intermediate batteries, and the other emplacements thrown up by the defenders, which they will probably be able to utilize to the best advantage; nor is it likely that the attack will be able to triumph, with only field artillery and light siege guns, in a few hours, over all the resources of the defence. The numerical superiority of the attack, if it exists at all, will certainly be very slight, until the arrival of the supplementary parts of the siege parks. But if, from any cause, delay is necessitated, the attack loses its special nature, and it can then only be regarded as one of the processes intended to shorten the duration of the siege. The "points d' appui" which occupy the important points of the line of defence, and which are intended to protect the intervals by means of flanking fire, would also have to be very badly organized to be rendered powerless in such a short time. The intervals are doubtless the weak points of the exterior girdle of defence, but not to the extent indicated by General von Sauer. Major Clarke is of opinion that attacks on intervals will never succeed. "No army has ever yet penetrated between the intervals of a line of properly defended forts, or ever will."* The numerical inferiority of the defence is also more apparent than real, as in the calculations of the numbers of the defenders available to guard each of the fronts, the garrisons of the various works, which are very considerable, are not included. It is true that they are supposed to be completely paralysed by the bombardment to which they have been subjected by the attacking batteries, either in their first or second position; and it is also taken for granted that these batteries will easily obtain the supremacy, not only over all the artillery in the works, but also over those which may be placed outside, but by supposing all these conditions realized, it appears that the attack is placed in too favourable a condition. It is also doubtful whether the assailant can content himself with forcing the intervals, or whether he will not be obliged to carry one or more of the detached works. Nor can it be supposed that he can pass over the accessory defences without meeting with a determined, and often insurmountable resistance, from the infantry and artillery, and above all, from the quick-firing guns of the defender; whilst in case of check, it will not be an easy matter for him to rally, at a short distance from the works, and remain exposed, apparently to no danger, until the attacking guns shall have regained the superiority of fire. The success of the assailant will be still more a matter of doubt in cases where the fight takes place upon ground which has been prepared beforehand. If his attempts are repulsed a few times, he will have no other resource than to establish himself on the ground he has won; and, whilst limiting his attacks, endeavour to advance from one position to another, until the assault may again be rendered possible, in which case, the fortress will profit by the time thus gained, and will delay the besieger as much as possible.

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* "Proceedings Royal Artillery Institution." Vol. 17, page 233, August 1889.

It is evident that even under the most favourable circumstances it can seldom happen that the approach to the fortress and the assault on the line of detached works can be carried out in the space of only two days. But when this line has been forced, it may still be necessary to capture the central fortress in order to arrive at a decisive result. Promptitude in carrying out all the details of the attack, being one of the conditions upon which its success depends it will be necessary to pursue the defender as rapidly as possible* to within a short distance of the enceinte, so that the guns mounted thereon, will not be able to fire for fear of hitting their own troops; while the intervention of those of the detached forts that may still be in a position to take part in the action, need not be greatly dreaded. The beaten enemy should not be allowed time to recover himself sufficiently to enable him to retake the offensive, nor should he be allowed to fall back upon the fortress, without being very closely followed up, as in that case the defending guns would be unmasked, and would pour a terrific fire upon the assailant and force him to retire to a position where he could wait, without being too much exposed, until his own guns could regain a sufficient superiority to enable him again to advance. In this case the former success would be greatly compromised. Intermediate lines of defence would facilitate the retreat of the garrison, and would considerably delay the fall of the place. Should it not be possible to follow up the success gained, with the required impetuosity, the attack of the central position will be conducted similarly to that on the line of detached works. General von Sauer believes that it will always be possible to occupy some of the "points d' appui," either on account of the bombardment having deprived them of further means of resistance, or of the forcing of the adjacent lines having rendered them untenable, in which case the assailant could establish himself in the captured position, and proceed to make his dispositions in view of the final action. During the second night of the attack attempts must be made, by means of heavy shrapnel fire, to break the *morale* of the defender, and to render difficult the service of his guns; at the same time, all the available pieces of ordnance should be advanced, so as to be in a position to bombard the town and fortress at day-break, when they should soon be able to overpower the defender's artillery. If the fortress wishes to avoid the necessity of an immediate surrender, an offensive return will, at this period, be executed by the reserves; but as the attack will have been conducted on several sides, it is probable that this attempt may be unsuccessful, especially as the defenders would be inferior in numbers, and demoralized by the loss of their outer line, whilst the assailants would put forth all their efforts in order to obtain a decisive victory. According to General von Sauer, the capture of the line of detached works would produce such an effect upon the defence that the assailant would be able in the majority of cases, to proceed at once to the attack of the central position, and capture it, without having to pass through the later phases of the fight.* It will be seen that, according to General von Sauer's ideas, three days after the attacking troops have arrived within the immediate vicinity of the fortress, the place will have fallen into their hands. But, in considering the possibility of this event, care should be taken not to concede advantages to the attack which are denied to the defence. It is certain that if shrapnel and plunging fire produce the results expected of them, if the defender's artillery is destroyed, and his infantry compelled to seek shelter until the moment that the assailants reach the position, or if, by the use of shells loaded with bursting charges, the flanking defences can be destroyed, then the asssult may be possible, and even easy of accomplishment. But it is improbable that these things will happen if the works are well constructed, the artillery properly placed, having a certain number of pieces of ordnance protected by cupolas, and with a brave and well commanded garrison. On the contrary, it is evident that if the artillery of the fortress is not destroyed at the very commencement of the proceedings, and if quick-firing guns form part of the means of the defence of the position, the attacking troops will be in great danger before they even reach the line of defence,† while if the defenders' communications are properly organized the further operations of the assailants will be attended with great difficulties. The capture of Ardahan may be taken as a partial illustration in support of General von Sauer's theories. "The Russian siege artillery‡ bombarded the place for two days, with such effect on the works and garrison that an assault was ordered for the evening of the second day, though General Loris Melikoff had originally intended to continue the bombardment all the next day. The attack was completely successful, and by 9 P. M., Ardahan was in Russian hands. Here is a case of a fortified town, surrounded by six casemated forts of strong profile, the commanding hills around being also fortified; yet the action of the siege guns so shatters the works and demoralizes the garrison, that an assault is fully successful. The Turks lost 3,000 men, of whom 1,000 were made prisoners; that is about half the garrison. The Russians, whose force amounted to about 23,000 men, lost only 550 men, on account of the demoralization which caused the Turks to abandon some of the works without defence. There were 92 guns in the place, the majority of which were Krupp 4-inch siege guns." All accounts ascribe the result chiefly to the action of the Russian artillery. Lieutenant Greene in his history of "The Russian army and its campaigns in Turkey in 1877-78" says: "the losses of the Turks were occasioned almost wholly by the Russian artillery, which seems to have been admirably served." It should, however, be added that the fortress was not well prepared for defence, and that this fact was fully known to the Russians. General Brialmont, who is an opponent of General von Sauer's theory, (as he considers that its success would be very doubtful, and that it would occasion enormous losses,) quotes the attack on Eupatoria in 1855 as a case in point, as it was carried out almost entirely on the principle now recommended by the Bavarian General.[*] "With his 22 battalions, 24 squadrons, 4 sotnias, 24 guns of position, and 76 field guns, General Kroulew formed three columns which advanced in three echelons. The guns which were in advance, were established behind epaulements at 500 *mètres* distance from the place, which was armed with 30 guns of large calibre and 4 field guns. After a few hours the defending guns having been to a great extent overpowered, the Russian artillery advanced to within 300 *mètres* and threw a hail of shell upon the town. Shortly afterwards the left column advanced to the assault under the fire of the four field pieces, which had remained intact, and of the defending infantry, but when it reached the counterscarp it was forced to halt and then to retreat, because it was not in a state to cross the ditch." This result, according to General Brialmont, proves that in order to have a chance of success, it will not suffice to reduce the defending artillery almost to silence.

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*"Revue Militaire de l'Etranger." Vol. 35, page 610, 1889.

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* Belfort may be mentioned as a case supporting this portion of General von Sauer's theory, as the central fortress succumbed on the capture of some of its outlying forts, without making any further struggle.

† "Revue Militaire de l' Etranger." Vol. 18, page 744, June 1889.

‡ "Field works," page 305. Colonel C. B. Brackenbury.

When operations are conducted by night, the chances of success would be greatly lessened by the employment of the electric light.[†] Whether it will be possible to carry out the attack of fortresses on the system advocated by General von Sauer or not, is at present an open question; but it is impossible to doubt that a thoroughly organized fortress, or even field works constructed on a proper system, cannot now be taken by an assault, as formerly conducted, on account of the tremendous power afforded to the defence by the use of magazine rifles, machine, and quick-firing guns, which will render the close attack by sap impossible to carry out, so that recourse must be had to the slow procedure of the regular siege, or to some method similar in principle to that which we have now been considering.[‡] Captain Stone, in the "Duncan" Prize Essay considers that it will be necessary to establish a "2nd advanced artillery position," armed with quick-firing guns, within a few hundred yards of the enemy's works, the "1st advanced artillery position" being about 1,500 yards distant therefrom, and from 500 to 1000 yards in advance of the "2nd artillery position." The object of the "2nd advanced artillery position" would be to flank the lines of approach to the breaches, and to keep up a heavy continuous fire on the flanks, as well as to search out every defensive position from which a bullet or shell could be fired; while the howitzers of the "1st advanced position" would pour in a hail of shrapnel over the heads of the stormers. It seems reasonable to conclude that more might be achieved by bringing matters thus rapidly to an issue, than by pursuing the alternative of sapping and mining right into the work, a process which still requires the ultimate assault in order to reap any benefit from it".* Major Savage, R. E., contends against this theory, and on page 320, Vol. 17, of the "Proceedings Royal Artillery Institution", he points out the danger of the "2nd advanced artillery position" being enfiladed by the besieged. He adds that quick-firing guns will certainly stop the advance of saps in the day time, but they must be dealt with by like weapons; and if the saps cannot advance by night, which is rather unlikely, the quick-firer cannot stop mining. These methods, he considers, are more likely to succeed than the open assault. It would, of course be a matter of the utmost importance to screen the attacking batteries efficiently, for which purpose the "ripple" screen (see Fig. 2.), invented by Colonel Richardson, R. A., would probably be invaluable, as it is practically indestructible.† Major Savage, however, objects to it on the score that its construction would entail an enormous amount of labour and that it would be useless against high angle fire. All screens and batteries should be arranged so as to attract as little attention as possible, which can be done by covering all newly thrown up earth with leaves, grass, heather, &c., on the side nearest the enemy. A battery which is made to look exactly like the ground on which it is situated, and which is armed with guns firing smokeless powder, will probably be found exceedingly difficult to hit. In this instance the result of continuous fire will be to heap up earth on the slope of C. Von Tiedmann mentions the attempt made to conceal the siege batteries before Longwy; ‡ "A peculiar method of construction was adopted to obtain more cover, and to reduce the chances of discovery; and this consisted in making the flanks with gentle slopes which could scarcely be discovered at a distance." Major Savage in a lecture recently delivered to the Aldershot Military Society || stated that visible angles and corners are now always rounded off in field fortifications, so as to make the work resemble the surrounding ground as much as possible, and some artillery officers who took part in the discussion which followed the lecture, dwelt strongly on the necessity of this rule being carried out, as when the slightest irregularity is discernible an excellent target is produced; whereas when everything is rounded off and made uniform, gunners do not know whether they are

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[*] "Influence du tir plongeant et des obus-torpilles sur la fortification," 1886.

[†] Experiments were conducted at Portsmouth, on the night of the 13th May 1889. with the view of ascertaining if the electric light was sufficiently powerful to enable the colours of the uniforms of troops marching to the assault to be distinguished, so that fire could be opened upon them. The positions occupied by the assailants were clearly lighted up by the electric light at Fort Rowner, and the colour of the uniforms was easily distinguished, blue being the least visible. The clouds of smoke caused by the firing helped to discover the march of the assailant; and it appears indispensable to the success o night attacks that fire should be reserved as long as possible.

[‡] Extract from the report of the Lydd experiments, by Colonel Baylay. "Range 300 yards; target, single deep sap, double sap, blinded sap:—even with the less powerful piece (6 pr. Hotchkiss quick-firing gun.) very few rounds sufficed to effectually demolish the sap heads; and also, in the case of the single sap, the *earlier executed* portions of the work. With regard to the blinded sap, the frame capsills being exposed as soon as the sap head was demolished, were soon cut through, leading to the fall of the overhead cover. Target, kneeling sap inclined at 30° to line of fire: the 6 pr. Hotchiss common shell burst in the sap roller, without displacing it; the fragments of shell appeared to search the head of the sap thoroughly."

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* "Proceedings Royal Artillery Institution" Vol. 17, page 164, 1889.

† "Proceedings Royal Artillery Institution." Vol. 17, page 168, June 1889.

‡ "Proceedings Royal Artillery Institution." Vol. 16, page 546, Decr. 1888.

|| "The application of Fortification to the requirements of the battle field," by Major Savage, Instructor of Field Fortification at the School of Military Engineering. Chatham, 1889.

firing right or wrong. In the same discussion it was stated by Major (now Lieut.-Colonel) Hutton, that "during the manœuvres in Switzerland in 1887, all defensive positions were masked by small trees and boughs being stuck roughly into the ground, the result being, that when viewed from a distance, there was nothing on which to fix the eye for the purpose of taking an aim." The importance of the above is now recognized in our own service. In "Field Artillery Drill," Vol. II, page 194, of 1889, we read that "newly turned earth is apt to form a conspicuous mark for the enemy's fire: in order to minimize this defect it is advisable to cover it with branches of trees, sods, or soil of the same colour as that near it" The author of this paper had an opportunity about 18 months ago of seeing some field entrenchments which were thrown up for practice in the vicinity of Metz, and which, while ensuring a certain amount of cover, varying according to the nature of the ground from about 2′ to 4′ or 4½′, were so constructed that no indication whatever would have been afforded to an enemy of their position, though every care had been taken to obtain a clear field of fire for the troops occupying them. Any one who has seen the mounds of earth thrown up in front of one of our own lines of shelter trenches, and who has grasped even to a slight extent the immense power of the plunging fire of the present day, would appreciate the advantage of concealing the position of field entrenchments as much as possible. It can hardly be doubted that one feature of the sieges of first class fortresses or entrenched camps, in the future, will be that the defenders, if well commanded, will not submit to a purely passive defence; but by the use of earthworks and the judicious employment of guns, they will endeavour to resist the approach of the enemy as long as possible. General von Sauer recognizes the fact that the "attaque brusquée" of which he is so powerful an advocate, could not succeed in all cases; but it is at least possible that it would present a fair chance of success when it is pushed home with vigour, and when a fortress has not been carefully organized, and every precaution taken to ensure a successful resistance. In the words of Captain Stone *—"If a fortress is worth besieging at all, it is worth while to make extraordinary efforts to bring matters to a successful issue in the shortest possible space of time. If it is not worth while to make these efforts, then let us be content with placing a corps of observation to watch the place, and leave the siege operations alone altogether."

It has been endeavoured in the foregoing pages, to compress into a comparatively small space a sufficient amount of matter to enable any officer who has perused them to be in a position to study for himself works treating of fortress warfare with more knowledge of the subject than he might otherwise have possessed; and, while quoting fairly and without prejudice the arguments used by the advocates of the various systems of fortification, to demonstrate that the subject is no longer confined to the abstruse though somewhat narrow principles, which have until lately been regarded as the keystone of the art; and which, though studied as a matter of necessity by many, could only be thoroughly mastered by

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* "Proceedings Royal Artillery Institution." Vol. 17, page 164, June 1889.

comparatively few; but that, on the other hand, notwithstanding the many recent formidable inventions, it is now to a great extent a question of good organization and preparedness, combined with common sense, and ability to adapt to existing circumstances the general principles of war: and that a practical application of these conditions will go farther to ensure success than an accurate knowledge of all the calculations and dimensions contained in the text books; which has too often been considered, at least theoretically and in examinations, to constitute all that is required to enable an officer to conduct the successful defence of a fortified place entrusted to his care.

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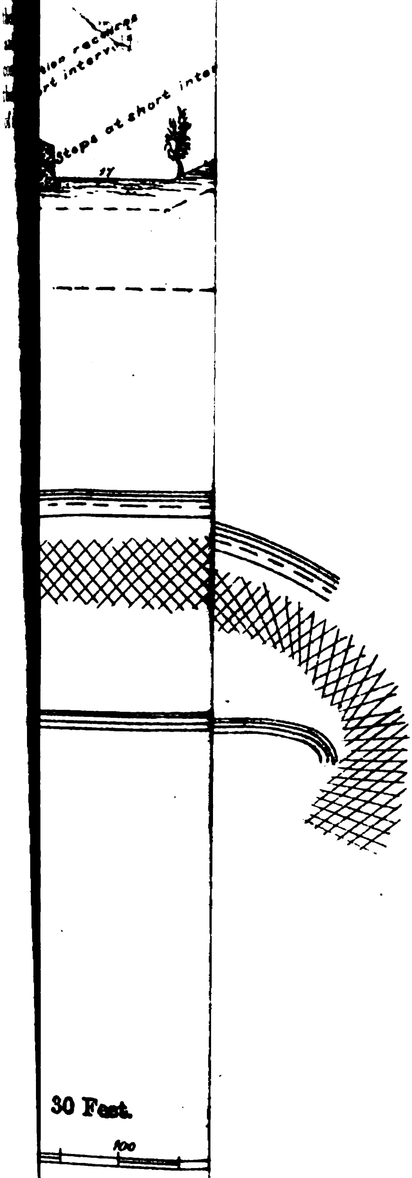

UNIV. OF MICH.

THE COMPANY AS THE TACTICAL UNIT OF THE FUTURE.

By Lieut.-Colonel W. E. Gowan, Commandant 38th Bengal Infantry.

Towards the beginning of the year 1888 it was my privilege to offer, for insertion in the Journal of the Institution, a paper entitled "A plea for the adoption of the company as the best unit of command in instruction and training and supervision in quarters." This paper appeared in Journal No. 70, published in March 1888, and now I would, with the permission of the Council, invite the attention of my brother officers serving in India to the intelligent discussion which the much larger question is receiving, viz., what is to be *the* tactical unit of the future? In that great store house of naval and military knowledge the *Journal of the Royal United Service Institution*, we find the elucidation of this subject, as reflected by military minds the most advanced and yet the most sedate and the most conservative in England. And though we cannot be present in the theatre of the Institution at the discussion of subjects which are of such supreme importance as the study of war in all its bearings, we can usefully turn to the pages of the above journal, and carefully weigh and profit by the opinions of riper intellects than our own. Thus, if we turn to a number of the journal of a remarkable character, No. 148, we shall see clearly set before us the gradual development of two ideas,—ideas that are surely gaining ground in military circles whether at home or abroad, viz., (I) that the company is to be the tactical unit of the future, and (II) that the selection of an officer for the post of company commander is a matter of the very highest importance. These are the principles then which are enunciated in the discussion which followed the lecture delivered on the 3rd April last by Colonel Lonsdale Hale, the text being "The recent changes in the drill of the German army."

By the term "company" we are not of course to understand the unit which now bears that name, a unit which within the first half hour of its coming within the zone of aimed breech-loading fire would have certainly melted away to the size of an ordinary section, but a company comprising at least 200 rifles. Of the unit so comprised we read that "henceforth the company is the only fighting tactical unit, and battalions, regiments and brigades are regarded on the battle-field merely as concentrations and assemblages of the fighting units, the companies, whence they may be drawn for the purposes of the combat."

It is clear then if this is to be the future organization of our army, that the relations of the captain towards the company under his immediate command are those of ever increasing importance and, as a prize essay writer puts it, it behoves "every captain of a company to pay more and more attention to each individual man of his company; on parade, at the musketry range, and in the lecture-room, he must impress upon every man, and urge upon his subalterns and non-commissioned officers, this question of fire discipline. * * * * * * It must be presumed that no regiment will take the field without having undergone some such system of personal and individual instruction as has been indicated above, and there is one leading feature which must not be lost sight of, namely, that the commander of a battalion cannot be everywhere and do everything, he has his own proper sphere of action, and he cannot take the place of his majors, captains, and subalterns. It is no good his attempting to do so, and such an attempt will only lead to confusion ; he must be content to let each individual officer carry out his individual part of the battle." * * * * *

"To sum up, fire discipline means decentralization of authority, no superior can properly control more than four to eight subordinates. * * * Let every man have his own task and see that he does it in peace, for often in battle it may be left entirely to him to do it without any one else to lean upon." * *

"Decentralize authority, educate individuals in peace with the greatest care that they may know their duty, and in action let them do it." (Captain T. F. Daniell, R. M. Light Infantry, Prize Essay on "Discipline, its importance to an armed force and the best means of promoting and maintaining it.")

That this reformation *can* be carried out we know, for one who has well studied the German military system, has placed it on record that "they (German regimental officers) thoroughly realize that the increased demands on the intelligence of the individual soldier have by no means lightened their task of training him, every company commander realizes too that increased responsibility is thrown on his shoulders, not only in learning to train his men up to a higher standard of individual excellence, but also in the fight itself, *as the company has now practically taken the place of the battalion as a tactical unit.* The German regimental officer is accustomed to and welcomes responsibility."

"I would point out what in the German system above all strikes an English regimental officer. These points are—(I). The absolute and unqualified responsibility of the company commander for the training and discipline of his men and also in the fight. (II). The marvellous intelligence brought out by theoretical instruction in the non-commissioned officers and men. (III). The individual training, the *Einzelausbildung*, of the recruit. * * In musketry drill, and everything else, the recruit is first of all trained individually and singly. (IV). The complete concentration of the training, (that is under the new regulations,) on the subjects of the fight, on that end for which the soldier exists, namely war."(1) (Lieut. G. F. Ellison).

To show to what a pitch of perfection the Germans have brought the training of their men so as to reach that high standard which alone can attach to regimental discipline and give it a real and solid significance, instead of the mere catch phrases of the hour ("fire discipline" and "fire control") let us here quote the opinion of the *Times* correspondent who attended the German military manœuvres in 1888. After praising the whole German military machine, he placed the infantry in the front as, all round, the best portion of the army. He thought the cavalry workmanlike and serviceable, but wanting somewhat in smartness. He, however, called particular attention, in the following passage, to the exertions the officers of the infantry made towards checking any undue waste of ammunition, *and in enforcing what they call a severe "fire discipline."* He says:—"Even when file-firing, the men are only allowed to expend three cartridges, and then look round for further orders. The better to attract the attention of their men amid the din of battle, all lieutenants and captains—the latter, by the way are mounted—are provided with a whistle. I observed too that the officers commanding the skirmishing lines always gave the men their aim and range, and they endeavoured *to see that their orders were strictly obeyed.* But in range finding also the men are themselves specially instructed."

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(1) With the Germans "company training" is not a question of imparting superficial knowledge of numerous and highly complex subjects and compressing it into 18 or 24 working days, but a matter of almost hourly yet very gradual initiation of the soldier into all the branches of a military education.

W. E. G.

Let us no longer allow it to be so truly said, as it is now, that "the German nation and army approach most nearly, in modern times, to the ancient ideal, and the conditions which called both into existence are strikingly similar, *viz.*, the pressing necessity for individual devotion and self-denial in the great cause of national existence."

"In England the necessity does not appear so pressing: the absence of immediate danger and the freedom from foreign aggression *causes the nation's pulse to beat slowly, and renders its interest in military matters somewhat languid.* We cannot attempt to train the nation, in order that soldiers possessing the desired military instincts may be forthcoming for its defence. We must, on the contrary, take the peculiar characteristics of our soldiers as we find them, and instead of trying to develop new idiosyncracies, study rather to make the best we can out of the material presented to us." (Captain F. G. Stone, R. A., 3rd Prize Essay on "Discipline: its importance to an armed force and the best means of promoting and maintaining it.")

Now the recognition by the supreme military authorities in Germany that "the company is to be the tactical unit of the future" has led to the "recent changes in the drill of the German army", and as a necessary sequence to the recognition of this great principle the training of all German infantry recruits has been placed entirely in the hands of the company commander. That this is so we can see by the following copious extracts from a valuable translation by Lieutenant G. F. Ellison, 2nd Battalion L. N. Lancashire Regiment, of a paper on the training of the German recruits by a distinguished German officer.(1)

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(1) Die Aushbildung der Rekruten der Infanterie in Wochenzetteln unter Berücksichtigung des nenen Exerzier-Reglements, Sowie der neuesten Verordnungen und Vorschtiften aus der Prazis Zum Gebrauch für Offiziere und Unter-Offiziere, bearbeitet von Busse, Hauptmaan und Kompagnie-chef un Grenadier-Regiment König Friedrich Wilhelm II. (Pommerisches) No 2. Zweite Auflage, Berlin 1888, Verlag von A. Bath, Pamp. pp. 46.

"Like everything else in the German battalion, the recruits' training is mainly influenced by one great principle, *viz.*, *the personal responsibility of the company commander.* The German captain has his raw recruits handed over to him in the first week in November, and he has to bring them up to a certain standard of efficiency, (and that a high one) in rather over twelve weeks, as at the end of that time the commander of the three battalions, which form a German regiment, will inspect, in a most searching manner, the recruits of each company, and every officer knows full well that to a large extent his chances of promotion depend upon the way in which his men then acquit themselves. *As regards the method of training, the captain is practically unfettered by regulations, and no one has a right to interfere with what he thinks fit to do, unless such action is directly contrary to the spirit of existing regulations, or manifestly would give but insufficient results.* Some officers have their own systems of training their men, while, on the other hand, others are glad to borrow ideas from such works as that by Captain von Busse".

"The actual method of working out in practice whatever system of training is considered best, is to all intents and purposes universal. The normal peace strength of a German company is one captain, two or three subalterns, 14 non-commissioned officers, 13 lance-corporals, and 117 or 118 privates. The captain knows that each year, in November, he will receive some forty-eight recruits, *for whose training he will be responsible.* As soon, therefore, as the autumn manœuvres are over in September, he sets to work to get his training staff in readiness. He tells off one of his subalterns as the officer who will be in charge of the recruits. After the arrival of the recruits this officer's sole duty will be to superintend their training and instruction *and to see that everything is carried out in accordance with the captain's wishes.* To assist him in his work he will have a staff of four non-commissioned officers (1) and eight lance-corporals, with the addition of one non-commissioned officer, and perhaps one lance-corporal as assistant, *who will pay especial attention to musketry.* On the recruits joining the company they are at once told off into four *korporal schaften* or squads, each of twelve men, under a non-commissioned officer, with two lance-corporals to assist him not only in the training but also in maintaining discipline in the squad, *which, as far as possible, is kept together in one barrack room.* Of the two lance-corporals, *one should be a good gymnast, as he will be specially told off to instruct the recruits in gymnastic exercises.* (2) During the next three months then the entire attention of this training staff will be devoted to training the recruits on lines similar to those proposed by Captain von Busse in his 'weekly tables'."

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(1) "Non-commissioned officers in the German army are almost without exception *men with less than twelve years' service, as after that time they have a claim on some post under Government,* of which the great majority avail themselves. German regimental officers state that *want of experience on the part of their non-commissioned officers increases the difficulty of training their men to an enormous extent.*"

(2) "It is very seldom the case that a German battalion has a regular gymnasium at its disposal. In one corner of the drill ground are erected a few simple gymnastic appliances, *e. g.*, horizontal bars and beams, ropes, ladders, &c. *Means are also given for practising applied gymnastics, e. g., a hoarding ten or twelve feet high for escalading, a broad ditch, which has to be crossed in heavy marching order, a shallow ditch about twelve feet wide for broad jumping, &c., &c.*"

* * * "There is, however, one matter peculiar to the German army, which is considered of such importance in the training of recruits that it can hardly be passed over in silence. *This is the 'Einzelausbildung' or training of individuals.* The German Drill Book published in September last, in its first section lays down. *'The foundation of the soldier's entire training * * * is the careful and strict instruction of the individual. Only by the most thorough instruction of the individual can the required combined action of numbers be attained. The faulty and incomplete instruction of a recruit, as a rule, affects him prejudicially during his entire service in the performance of his duties. Faults, which are allowed to creep in during the initial stages of the instruction are rarely completely eradicated. It is likewise impossible to remedy defective training of the individual by combined practices.'* In Captain von Busse's book the reader will see what this training of the individual means, *viz., that no work is performed by the squad as a whole, either in marching, physical training, the manual exercise, position drill, &c, or indeed, in any part of the recruit's course, before each individual has attained a certain standard of proficiency in that particular subject.* To this system of *individual instruction* must be attributed that *uniformity of training and military education* in the German army, which is one of its most striking points. Any one who has ever seen German recruits at work will know well what *the individual training is in practice.*" * *

"Another rather vague term (in Captain von Busse's book) *which implies a great deal* is the 'independent use of the rifle', so often referred to. This is equivalent to the 'Gefechtmässiges Einzelschiessen' or the use of his rifle by the soldier when acting *entirely on his own responsibility in the fight, all control of the firing by his superiors having become impossible.* In order to create in the men the requisite self-reliance, when thus firing uncontrolled, and to prevent them wasting their ammunition under such circumstances, in other words, to get *a proper fire discipline,* the Germans consider that *a very advanced knowledge of the theory of musketry is essential for each individual soldier.* As evidence of what this knowledge is, the present writer can adduce his own experience, he having on one occasion been present when a squad of young German soldiers was being asked *most intricate but practical questions on the trajectory of their rifle,* the men giving their answers with a readiness which was indeed marvellous. The German infantry recruit spends about five hours each day *in practical work,* either on the drill ground or in the neighbouring country, *viz.,* three hours in the morning and two hours in the afternoon, a break of about two hours, from midday to 2 P. M. being allowed. Besides this he has one hour's theoretical instruction daily, given either by the officer or the *non-commissioned officer of the squad,* with a lesson in cleaning and mending his kit, &c., in the evening."

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"After the inspection his training and instruction is continued without intermission *in the 'zug'* (1) *or company,* &c. He has, however,

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(1) "A *zug* is the 3rd part of a company. The *zug* is divided into sections each of from 4 to 6 files." Tr.

then ceased to be a recruit, for the Germans hope that in consequence of *the great simplification of their drill*, &c., due to the new drill regulations, they will now be able *to convert, in the course of twelve weeks, raw material* (which, under a system of universal conscription, is, and must necessarily be, inferior to that of a voluntarily enlisted army) *into soldiers fit, if need be, to at once take their place on service* in the ranks of one of the most highly trained armies which the world has ever seen."

"In the 2nd edition of the 'Training of recruits in the infantry in weekly tables, with reference to the new drill book, as well as the most recent orders and regulations, for the use of officers and non-commissioned officers, worked out from practical experience by von Busse, Captain and Company Commander', we come across the following striking passages."

"The new infantry drill book has appeared and been taken into use. Much that was old is gone, and has given place *to new measures adapted to the increased demands of the present day.* Besides completely maintaining the discipline hitherto in force, so runs an army order of September 1888, the drill book is intended to give wider scope in training for the exigencies of the fight. For this reason, it is perhaps necessary that the training of the young soldier should be in character *essentially different to that of the past*, it will become considerably more concentrated on the actual objects of the fight, *on that end for which the soldier exists, namely war, the individuality of each single soldier* will take its place more prominently in the foreground. *The task of those to whom the training is entrusted increases, however, in proportion as more is expected of the individual soldier. They have to work on a material differing in its quality to no considerable extent from that of former days, when what was expected of it was substantially less.*"

"The new infantry drill book, taken in conjunction with the other recent regulations, demands, in a still higher degree than hitherto, not only increased and well regulated energy on the part of the training staff, but also a most thorough control of the system of training, as it progresses, on the part of the immediate superiors. A proper distribution of time and daily tasks is accordingly one of the foremost problems *for those on whom the responsibility falls* and the chief factor in the attainment of the object in view."

"I have been induced (says Captain von Busse) to publish a new edition of these weekly tables of work, partly owing to the above mentioned circumstance as well as to the consideration that it cannot be otherwise than advantageous for the training staff to have at its disposal a definite plan on which the young officer and non-commissioned officer can confidently continue to work, without having to make experiments for themselves, (experiments which are doubtful and not always accompanied by success,) and partly, too, in consequence of the favourable reception which my work met with last year."

"I, therefore, hand over to my brother officers these weekly tables, at the same time pointing out that they by no means aim at undermining the *individual independence of those who alone are responsible for the recruits' training*, but that they are only intended to point out one of the many roads which lead to success. I am quite ready to admit that there may be other ways quite as good as the one which I have proposed."

(Signed) VON BUSSE.

"Amongst the most practical of the entries in Captain von Busse's tables we would point to the following.

During the first four days after the recruit joins his company.

1st day. * * *

Fitting uniform, fatigue-dress and drill order, also one pair of boots.

* * * *

2nd day (morning).

* * * *

Articles of war to be read to the men, and explained by the company commander. Forms to be observed in taking the oath.

* * * *

(Afternoon).

* * * *

Colour-sergeant makes a list showing recruit's antecedents, and his civil *status*.

Requirements for cleaning kit laid down.

One hour's instruction by the non-commissioned officers in the first principles of order and tidiness in barracks.

3rd day (morning).—Fitting clothing continued if not completed, issue of *second* pair of boots and necessaries not yet served out."

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WEEKLY TABLES OF TRAINING AND INSTRUCTION.

FIRST WEEK.

* * * *

"RALLYING.—Falling in in one rank with one pace interval on a named man, an odd or even number, or according to the letters of the alphabet, &c. Principles of dressing and covering must at the same time be taught."

"SALUTING.—Passing the instructor individually in *a smart natural way* without turning the head. Saluting by bringing the right hand to the forage cap. N. B. German soldiers always salute with the *right* hand."

"DRILL.—Position of the soldier, quick step, changing step. Turnings. Dressing back individually in two motions, keeping the hips braced up. Principles of dressing and covering. Stress to be laid on the *importance of remaining motionless in the ranks*. (1) Squads, always at open interval, marching in and out of step. (2) Piling arms."

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(1) This soldierly habit is never properly observed by natives. W. E. G.

(2) "In Germany, in order to avoid fatiguing the men as far as possible when on broken ground, one very frequently hears the word of command 'Ohne Tritt (out of step), Marsch' given, and this even at regimental and brigade drills and at manœuvres, when a company column (the invariable formation for movement) has to take up a new position. The men then move off with no pretence at keeping step, but preserving their dressing, sloping their arms correctly and keeping silence, just as they would when marching at attention. On the field of battle deployment for the fight may be in step or out step otherwise all movements out of reach of hostile fire are out of step, but in step immediately the companies come under effective fire. German Drill Book, Part I. § 200" Tr.

"AIMING.—(It is recommended that *from the first day onwards* the recruits should be practised in aiming by the non-commissioned officer *specially told off in the company to look after musketry.* This non-commissioned officer's duty must, however, be regarded *as only accessory* to that of the non-commissioned officer of the squad). Explanation of the different kinds of targets. Employment of the sights. Principles of aiming, explanations of the line of sight, line of fire; *trajectory being, however, at first quite omitted.*"

"The non-commissioned officer aims a rifle, which rests firmly on a tripod, at a point on a target 20 *mètres* distant, and makes the recruit say where he has aimed."

"The lance-corporal of the squad practises the recruits in closing the left eye, and also in various exercises calculated to make the wrist and hands supple, and to extend the grip of the right hand. (N.B. The German soldier is taught to grasp his rifle *as firmly with his right hand as with his left.* Tr.)"

"POSITION EXERCISES.—Position drill *without the rifle* in three motions. The lance-corporal practises the recruits in various exercises *with a dummy rifle.* (This is used much as clubs are, with the object of strengthening the wrist and arm generally. Tr.) Further, the recruit will be shown the simple motions of loading, in learning which he will have to assume the so-called 'sportsman's position' *i. e.* no attention is paid to his position, this not being in accordance with regulations."

"THEORETICAL INSTRUCTION.—*For the first three weeks.*

(*a*).—By the officer.

Articles of war. Every recruit must know by heart Articles 2 and 43, concerning the oath and the punishments for sleeping, smoking (when forbidden) or lying down, or laying down arms, or leaving a post when on sentry; universal military service, this is to be closely connected with the history of the regiment. * * Procedure in making complaints.

(*b*).—By the non-commissioned officer.

I.—Barrack and barrack-room arrangements, especially method of arranging cot. * * Barrack-room orderly duty.

II.—Method of making requests and complaints. How to act in case of sickness.

III.—Bodily cleanliness. How to clean kit, &c."

* * * *

"In connection with this theoretical instruction by the non-commissioned officer, Captain von Busse writes;

I.—*The instructor must take care not to instruct the man in more than is absolutely necessary; he must teach him only so much as it is expedient that he should know.*

II.—When a fresh course of theoretical instruction is introduced, *he must not put too much before the recruit all at once.* He must rather divide the food for his mind into small portions, and not proceed further *until he is convinced that what he has already taken in has been thoroughly digested.*

III.—He must give his instructions as far as possible on the lines of the existing regulations *and as little as possible out of books of instruction.*

IV.—Time for *theoretical instruction, which usually lasts one hour*, should be so regulated that *a quarter to half an hour* is devoted to *repeating what has been previously taught*, and the *remainder* of the time *to introducing new matter.*

V.—In order *to keep the attention* of the recruits, which often (especially if the theoretical instruction be given in the evening), will have been already strained by the day's work, it is to be recommended that, when asking questions on what has been taught, the question should first be always put to the squad at large, and then a recruit be named to give an answer. By this means all the recruits are obliged to have their answers ready."

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"GENERAL REMARKS. * *

"The men must be practised in making simple reports, (1) also instructed how to act on falling in or if ordered to fall out, in the course of a parade."

"When marching to the parade ground, picking up step, changing step, front forming, and file marching "out of step" (2) should be practised."

"*All officers of the unit to which the man belongs, (his immediate superiors first of all), must be pointed out to him as soon as they are seen, and their names told him.*" (3)

"*One hour daily must be devoted to aiming and position exercises.* The close of the morning parade, or the commencement of the afternoon parade, is the best time for these practices.

"The clothing of the recruits must *daily, from the very first, be carefully inspected.*"

"The *lance-corporal must never instruct the recruit in anything new. He* may only *repeat* what has been already taught."

* * * *

"As soon as rifles are entrusted to the recruits, a commencement must be made in instilling into them *the elementary principles of the independent use of their weapon.*"

"It is to be recommended that twice a week in the evening, instead of the kit cleaning and mending lesson, *practical instruction in cleaning the rifle should be even thus early commenced* and that this should be continued during the following weeks."

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(1) "In a similar work it is recommended that each day the non-commissioned officer of the squad *should give to at least three men of his squad some simple message which they will have to hand on to the officer in charge of the company's recruits next morning. It is further recommended that various short messages, which would be likely to be sent on service should be dictated by the officer and written down by the non-commissioned officers in their memorandum books*". Tr.

(2) Native troops are notoriously bad at file marching even when in step.
W. E. G.

(3) Sepoys *never* know a British officer's name correctly and so they speak of the "Kamanyar Sahib" (C. O.), the "Major Sahib" (2nd in command), "Kaptan Sahib" (Wing Commander), "Adjeetan Sahib" (the Adjutant), and the "Chhota Sahib" or the "Naya Sahib" when they mean any fresh joined probationer. In these days of rapid changes such vague indications are to say the least a little confusing. W. E. G.

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SECOND WEEK.

"RALLYING.—Fall in in file turned to right or left, with one pace interval. Principles of covering to be explained at the same time."

"SALUTING.—Passing the instructor at the attention, with head turned right or left. Saluting with the hand. Fronting and standing to attention."

"DRILL.—Position of soldier, turnings, dressing back independently with hips braced up, judging the time. Dressing individually in line with one pace interval by both flanks, on files advanced three or more paces in front of the alignment. Slow step in two motions, with hips braced up, marching the squad in step and out of step in line and in file. Principles of the turnings."

* * "Foot note adds.—As regards the value of the slow step, which is not regulation, the most varied opinions prevail. *The correct value will be found in this case in a medium course.* It is unnecessary to worry recruits who have well-shaped, straight, and supple legs, with this extremely severe and fatiguing exercise: it should be applied rather *to those only who are clumsy* with crooked and stiff legs *and to such as are careless.*"

"MANUAL AND FIRING EXERCISES.—Instruction in carrying the rifle at the slope."

"AIMING.—Explanation of medium, full and fine sights. Necessity of keeping the sights upright and the foresight exactly in line between the centre of the back sight and the object aimed at. Instruction in the sight, full or fine, &c., to be taken at various ranges, *and also the part of the target to be aimed at.*" (1)

"The non-commissioned officer makes the recruit aim a rifle at various points on the target, one placed at 100 *mètres* distance, *e. g.* the bottom of the target, the bull's eye, &c."

"Thorough description of the mistakes made in aiming, with practical instruction in the effects of not keeping the sights vertical, of the tip of the foresight not being exactly in the line between the centre of the back sight and the object aimed at, of taking a fine or full sight *without defining the reasons. The recruit will continue to make progress until he at last aims correctly.* Errors in aiming, with reference to § 16(2), German Musketry Regulations. Practices in loading with dummy cartridges and in filling and afterwards unloading the magazine, are to be constantly carried on. *Practice in closing the left eye.* Wrist exercises."

"TRAINING FOR EXTENDED ORDER WORK.—On the two days in the week (2) on which the recruits *march out into the country,* the non-commissioned officers practise their squads, formed as sections of six files, *i. e.*, groups, in the elementary principles of skirmishing with the rifle, according to §§ 127—130 German Drill Book, Part I. (These sections refer to a line extending at the halt and when in motion.—Tr.)"

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(1) "The standing sight of the present German rifle is 200 *mètres*, there is also a small flap, which is additional to the leaf of the back sight, for 300 *mètres.* Such instruction as the above is therefore most necessary." Tr.

(2) "The new German Drill Book § 65, Part I., lays down. 'At least twice in the week, as soon as they have served two or three weeks, the recruits *must be marched out into the country* to be trained in extended order work. This is a decidedly beneficial change during the period of *formal drill instruction,* which can best be furthered by the recruit bringing with him a certain insight into the *practical application* of the extended order formations practised on the drill ground.'"

"Intervals between files, points of direction, *how the individual man should act*, and his position when in extended order, according to §§ 67—68 New Drill Book, Part I.(1) Bringing rifle to the shoulder *without regard to the regulation position.* These occasions must also be utilized to further imbue the recruits with *the first elements of the independent use of his rifle.*"

"A foot note adds :—Attention must likewise be paid to this point, *i. e. the independent use of the rifle, when extended. On every possible occasion,* the hours in which practices in aiming and position drill take place are especially adapted to such instruction."

"MEN'S CONDUCT IN RELATION TO SUPERIORS.—Regimental organization from the squad up to the regiment inclusive."

* * * *

"From this time forward the recruits with rifles will be taken out into the country *by an officer, accompanied by a drummer and a bugler.* Steadiness in marching and simple evolutions will be practised. The drum is to be played both on the march out and on the way back to quarters, *that the recruits' ear may be accustomed to 'time,' as soon as possible.* By this means the subsequent instruction of the recruits in 'marching past' will become very much easier."

THIRD WEEK.

* * * *

"RALLYING.—Falling in in one rank with one pace interval facing to the rear: also falling in on an alignment, *oblique to the proper front.*"

"SALUTING.—As previously, with addition of saluting by twos and threes."

"DRILL.— * * In line with one pace interval, dressing by both flanks on points. (The non-commissioned officers on the flanks are the 'points for dressing on' in the German army. Tr.)"

"MANUAL EXERCISES.—Instruction in carrying the rifle at the slope."

"AIMING.—The non-commissioned officer makes one man aim with his rifle, using the standing (200 *mètres*) sight, and the small (300 *mètres*) flap, while another man checks his aim.

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(1) "The new German Drill Book lays down in § 68.—'For extended order work, the soldier must be practised in *surmounting obstacles*, especially jumping over or scrambling through ditches, scaling and climbing over walls, hedges, &c. Likewise he must be able to *steal* over the country, *i. e.*, *advance protected against fire, by taking advantage of every bit of cover.* At the same time, however, the fact must not be lost sight of *that in the majority of cases the straight way is the best way*, and that the individual soldier can almost always find cover by going only a short distance out of his way and by adapting himself to circumstances, *i. e.*, by stooping or crawling.'"

"With reference to this question of taking cover § 76 adds *in large type 'all considerations as to cover must, however, be looked on as secondary to those regarding fire action.'*"

Target, if possible, 150 to 200 *mètres* distant. *Simple explanation of the line of sight, line of fire and the trajectory. The man learns the method of pressing the trigger of a rifle, which is lying firmly on a tripod.* Aim to be checked according to regulation. Musketry Regulations § 16 (3)."

"The non-commissioned officers make a rough copy of the results obtained, and enter these in a special register, kept for the purpose, so that later comparison may be made with subsequent entries, and that the progress of the recruits may be thus tested."

"POSITION EXERCISES. * * The recruit learns the 'Ready' position, correctly gripping the small of the butt."

"Arm and wrist exercises with the rifle. Bringing rifle to the shoulder, without regard to the regulation position. Practice in loading continued."

"GENERAL REMARKS. * * * On the drill-ground the recruits are kept thoroughly on the alert by taking measures tending to that end: frequent changes of position, *sudden orders to carry out something unusual will effect this.*"

"Examination of recruits in reading and writing. Non-commissioned officer's report whether helmets and boot fit, whether the recruits have sore feet or swollen legs."

"At the close of the week, inspection of the squads in saluting, fronting, individual marching at 'the attention,' and at the 'double' without the rifle, individually."

FOURTH WEEK.

"RALLYING.—As previously in single rank, but without intervals. At the close of the week all the recruits of the company facing the front under the officer."

"DRILL. * * Dressing individually by the right or by the left, with one pace interval, on files, (1) *the alignment being oblique to the proper front.*"

"AIMING.—The lance-corporal continues the instruction in aiming, pressing the trigger, loading, &c., as hitherto, while the non-commissioned officer devotes himself more to the position exercises and *repeats the aiming practices only with those who are backward in aiming.* Practical instruction in the figure targets and their varieties, at the same time showing them to the recruits. Musketry Regulations § 8(3)."

("The figure targets used in the German army are of a most practical nature. They are made of paper, with a backing of canvas and represent a German soldier in drill order (*i. e.* with the tunic, dark trousers and accoutrements, red facings, with rifle under the arm and cap on the head). The standing figure is nearly 5 feet 7 inch high. The Musketry Regulations contain a plate, showing where the figure is to be cut through, if a 'head and shoulder' or kneeling or half or three quarter length target is required. When required for use this figure is fastened on to a very rough frame consisting of a lath varying in length, according to the size of the figure, with two or more cross pieces nailed to it. These figure targets are used for the range and also for field firings. Similar figures of mounted men in life size are also used at field firings."—Tr.)

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(1) "This dressing on files answers nearly to 'dressing a line' § 6 Part III. of our Drill Book, three or more files advancing a certain number of paces, according to order, the remainder dressing up on these files." Tr.

"POSITION EXERCISES.—Ready position and gripping small of butt continued."

"Position standing by numbers, without pressing the trigger, but firmly grasping the small of the butt with the palm of the right hand. The muzzle must be slightly supported in front during this practice. Each recruit explains, as well as he can, in his own words, the various motions of coming to the present."

"TRAINING FOR EXTENDED ORDER WORK.—Instruction on the extended line, in its normal form, repeated by the non-commissioned officers to their squads, and by the officer to the recruits of the company collectively."

* * * *

"Likewise making use of ground (free field of fire, getting a rest for the rifle, getting cover,) will be explained to the recruits, *small detachments of trained soldiers illustrating the instruction.* This will be repeated occasionally in the following weeks."

"JUDGING DISTANCE.—Measuring paces. 100 *yards laid down accurately and then paced out over different ground surfaces.* Draw necessary appliances."

"THEORETICAL INSTRUCTION.—(a). By the officer.

Musketry instruction, with strict adherence to the Musketry Regulations. Especial attention to be given to para. 5 and to *practical musketry generally.* (This section describes *the influence of the atmosphere, of wind, and position of the sun on shooting.* Tr.) Use of the sights and regulations regarding holding the rifle. *Independent use of the rifle,* according to the Musketry Regulations, Para. 35. A footnote adds: *Less will be gained by the recruit having an accurate knowledge of the angles formed by the line of sight with the line of fire, trajectory, angles of elevation, &c., than by his being most thoroughly instructed in the practical use of his rifle.*"

("The Germans have a most ingenious method of *practically showing* the recruits what the trajectory of the rifle is at various ranges. Supposing that it is desired to show them the trajectory at 400 *mètres,* the squad is drawn up and points are thrown out to the front at every 50 *mètres* up to 400. These men have in their hands a stout lath, about 6 ft. long, to which is attached a flat metal disc, painted white with a black bull's eye in the centre; these discs being larger in size the further the man who holds it is from the squad."

"On each lath in successsion, *i. e.,* at 50,100,150, &c. up to 400 *mètres,* is marked the proper height of the trajectory for any given distance at the spot where the lath is being held. On the command being given to set the discs at 400 *mètres,* each man slides the disc to the 400 marked on his lath, and fixes it there by a screw, which passes through the socket, by means of which the disc is attached to the lath. The man at 400 *mètres* naturally does not move *his* disc. The men will next be ordered to rest the foot of their respective laths on their waist-belts. The squad of recruits can now, by looking at the bull's eye at each distance, see at a glance exactly what the path of a bullet would be, if they fired from their present position at the breast of a man standing at 400 *mètres* distance, and between what distances men *standing* would be safe from their fire. Or the men may be ordered to kneel, and the man at 400 *mètres* to rest his disc on the ground. The others then rest the butts of their laths on the ground, and the recruits can see what would be the effect of firing *kneeling*, from where they are, at the foot of the man who is kneeling at 400 *mètres*. The same thing can be done with numerous variations. In the German army *great importance* is attached *to this knowledge of the trajectory*, as being a most important element in the training of the soldier 'to use his rifle independently,' which means that *he must know* what firing position he should be in, *what sight* he must use, *what part* of an opponent he must *aim at*, so as to make sure of hitting *when he is acting entirely on his own responsibility in the fight*." Tr.)

"BUGLE CALLS.—*During the fourth week the following must be learnt by the recruit.*

Reveillé,
1st Post
Tattoo
Fire Alarm."

"A footnote adds: The weekly table of calls is handed to the bugler and he is instructed to sound only the calls prescribed for the particular week, and these slowly and repeatedly one after the other."

"GENERAL REMARKS.—When the non-commissioned officer told off in the company for musketry is available, he will henceforth devote during each day three quarters of an hour or an hour to the aiming and position exercises with the squads. *Especial attention is to be paid by him to recruits who have been put back in these exercises.*"

"*The non-commissioned officers report whether pairs of boots fit, and whether the recruits have sore feet or swollen legs.*"

* * * * *

"The officer checks each individual man in aiming during this week: *he makes a note of those who aim badly and continues to check their aiming till improvement is noticed.*" * * *

FIFTH WEEK.

* * * *

"DRILL.—Turnings, &c. 3 to 4 men at a time in close order, judging the time. Dressing with one pace interval, 3 to 4 men simultaneously, on points and files. Rapidly covering on the right or left flank man, who is advanced a few paces."

* * * *

"POSITION EXERCISES.—The non-commissioned officer passes on to the position at the aiming rest, and at the same time makes the recruits load with dummy cartridges. Only the position, not the aiming, is to be checked. The trigger is not to be pressed, but care must be taken that the sights are kept upright."

("The aiming rest consists of a light vertical post about 4 feet high, to which is fastened at the top a flat cross-piece, about 5 feet long, 4 inches in depth, by 1½ inches in thickness. This piece is not exactly perpendicular to the post, but rises from right to left at an angle of about 12 degrees with the horizontal plane. On the top edge of this cross-piece are cut thirty small notches, each about 2 inches long by 4 inches deep. These notches are numbered, so that the soldier can always remember the notch which best suits him in aiming from the rest. Each squad has one of these aiming rests for its own use."—Tr.)

"TRAINING FOR EXTENDED ORDER WORK.—Repeat what has been taught hitherto. The recruits will be practised in the open country in the various positions for firing, *viz.*, standing, kneeling, lying down, behind thick and thin trees, behind earth works, shelter trenches and other objects. §§ 69—77, Part I. New German Drill Book." (1)

"JUDGING DISTANCE.—50, 100, 150, 200 *mètres* to be marked out with banneroles, soldiers, standing, kneeling, lying down, to be placed by them. The recruits must get a thorough idea of the distances first by the banneroles and afterwards by the men alongside. Apparent size of the men at the various distances, and distinctness with which they can be seen: explanation of the various influences which affect the vision. Transposing paces into *mètres.*"

"BUGLE CALLS.—The general call.
The battalion call.
The four company calls."

"GENERAL REMARKS. * * As experience teaches that the recruits lose ground in readiness in aiming, it appears necessary that he (the non-commissioned officer) should occasionally during the week take the squad, *especially such as are doubtful in aiming*, to the tripods, and make them aim with the rifle resting on a sand bag."

"At the close of the week inspection of the squads in position exercises in two ranks with intervals, dressing singly on points, marching individually, sloping and ordering individually, breasting the horizontal bar,

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(1) "Section 71 lays down.—'For accuracy and comfort in aiming when lying down, it is especially important to get support for the rifle.' At German manœuvres one constantly sees this precept carried into effect. A firing line, if checked in a position where no natural support for the rifle is obtainable, as in an open field, immediately proceeds to obtain it artificially. Every other man carries a small spade. While therefore his comrade keeps up the fire on the enemy, the man who has the spade throws up a small mound of earth in front of him in two or three minutes, or merely cuts out a few sods, which could not afford him effective cover, being intended only to act as a rest for his rifle. He then hands his spade to his comrade, and himself opens fire."

"Sections 73, 74, 75 give directions for firing from behind thick or thin trees and breast works, and add that the soldier is to be instructed in making use of walls, hedges, ditches and even unimportant irregularities of ground to obtain cover and get a rest for the rifle. *In firing from behind thick trees the left forearm is to be rested against the tree, while the palm of the left hand is to be pressed against the trunk of a thin tree*, the rifle being supported between thumb and forefinger. The fact that the German soldier is taught to press his rifle to the shoulder *as much with the right hand as with the left* makes it possible for him to fire from such a position." Tr.

'travelling' along the bar, bending and stretching the arms with hands resting on the bar, position standing without aiming or snapping."

SIXTH WEEK.

"POSITION EXERCISES.—The non-commissioned officer, after the recruit has learnt to load with dummy cartridges at the aiming rest, teaches him *the method of pressing the trigger, checking his aim being no object. Next comes snapping, a dummy cartridge being in the rifle,* position standing, checking aim no object. The rifle should have some sort of support."

"TRAINING FOR WORK IN EXTENDED ORDER.—Repeat and continue the different firing positions with all sights. *A man having been placed to represent an enemy, for the present at a short range,* the non-commissioned officer must now show the recruit how to make use of the ground so as to get the fullest effect for his own fire, *at the same time reducing the effects of the enemy's fire to a minimum.* Further instruction in §§ 78—80 Part I. New German Drill Book."

"JUDGING DISTANCE.—The recruits must point out different objects 50, 100, 150 and 200 *mètres* distant from any given point. The distance between these points must then be paced out, the paces put into yards, or it can be measured with a tape."

* * * *

"BUGLE CALLS.—March (slow and quick step).
Halt.
Assemble.
Alarm.
Repeat all calls learnt hitherto."

"With regard to the bugle call for the 'march,' the new German Drill Book says :—'If this call is sounded in usual time, troops set off at the quick, if sounded very quickly, they will double up. In the transport of troops by rail, it means that the men leave the carriages.' Regarding the 'assemble' (in the open, in close order) it lays down, 'If the battalion call is sounded before it, it means :—

Alarm (most rapid assembly possible in full marching order on the alarm parades or occupying specially ordered points).

Conclusion of manœuvres for the time being (on which all troops without further delay march back to their billets or to any other place where they are to be quartered)."

"GENERAL REMARKS. * * From the middle of this week onwards greater stress is to be laid on the manual and firing exercise."

"The non-commissioned officers report whether the recruits have sore feet or swollen legs."

SEVENTH WEEK.

"AIMING AND POSITION EXERCISES.—The instruction in aiming, which has been previously given, is now repeated, *attention being at the same time paid to a good position at the aiming rest.* The aim must be checked by means of auxiliary sights, at first aiming without pressing the trigger and releasing the spring, afterwards this also being done. *Drawing in the breath to be practised.*"

"TRAINING FOR WORK IN EXTENDED ORDER.—Movements of the separate groups under the group-leaders *over broken ground, being opposed by a skeleton enemy.* The officer commences practising the men in *fire discipline in groups.* New German Drill Book, Part I. §§ 133—142."

"The gist of these sections is as follows:—§ 133. Firing on the move only to take place exceptionally. § 134. *At drill, sights are to be most carefully set to distance ordered.*"

"§ 135. The word of command to an extended line to be as short as possible, *and to give first direction, then the distance, and lastly the kind of fire.*"

"Instance (a). 'At the green hill top, artillery! Sights 800 and 900! Ready! Present! Fire! Load!' (b). 'Right in front, extended line lying down! Sights, 500! Independent firing!'"

"§ 136. Ceasing fire on word of command or whistle sound, and recommencing on order 'Continue fire'!"

"§ 137. Fire to be *effective* depends

(a) On hitting.

(b) On concentrating fire.

Musketry Regulations lay down size, &c., of objects to be fired at, at various ranges, to get good results."

"§ 138. Control of fire in action—*Zug*-leader to keep the fire of his *zug* under his control as long as possible. Intervals to be kept between *zugs* in firing line. *Zug*-leader to keep two or three men who are good at judging distance near him. Distance to prominent objects to be measured, if possible. Otherwise use of map or simple judging distance recommended. Frequently changing objects to be fired at to be avoided."

"§ 139. Kinds of fire to be employed."

"RAPID FIRING.—Against objects which offer a good mark for a short time only. Also against artillery at ranges over 800 *mètres.* Volleys—best for keeping troops in hand and finding range. Impossible, however, to make voice heard by an extended line in the roar of battle. Volleys can, therefore, only be employed at commencement of a fight, or when troops are not being fired at by the enemy."

"INDEPENDENT FIRING.—Usual for an extended line. Men are more likely to hit. The leader, by first stopping fire by whistle sound, can order more rapid (or slower) firing or magazine fire, as he thinks fit."

"SLOW FIRING.—This means that no two men of a file have their rifles up at the same time. In rapid firing this does not matter."

"§ 140. FIRE DISCIPLINE.—*This embraces the conscientious carrying out of all orders given to the firing line in the course of the fight, also the most exact observance of the regulations regarding the use of the rifle and the man's conduct in action.*"

"*Fire discipline further demands steadiness under hostile fire, even though it must not at the moment be replied to, care in firing each shot, and skilful use of the ground to increase the effect of one's own fire. It also requires that the man's attention should be constantly given both* *to the leader and to the enemy, and that the man should at once cease firing on his leader sounding his whistle, or on his getting the order to do so in any other way."*

"Fire discipline must, by training, so become a second nature in the man that he never loses its influence, even *when*, in the course of a fight, *complete control of the fire by the leader becomes impossible, and when finally nothing remains to guide the conduct of the firing line but each man's own judgment, or the example set by particularly brave and judicious soldiers.* In order to create and keep alive in the man self-reliance he must be made accustomed to circumstances in action, when all control of the firing has ceased, and he must be taught how to act in such circumstances."

"§ 141. Observing the effect of fire."

"§ 142. Re-formation of an extended line."

"JUDGING DISTANCE.—Make the recruit pace up to a point which he judges to be 25, 50, 100, 150 or 200 *mètres* from an object in the open country, or to be a certain distance from where he is standing, measured in a straight line. Paces to be then turned into yards or the distance measured with a tape."

"THEORETICAL INSTRUCTION. (a).—By the officer. As in the 4th, 5th, and 6th weeks."

"(b).—By the non-commissioned officer.

(1).—How the soldier should conduct himself in marching to the rifle range, and what his duty is on the range itself. § 25, Musketry Regulations.

(2).—Ammunition and targets. § 8.—*Ibid.*

"BUGLE CALLS. (1)—Attention.
Fix Bayonets.
Commence Firing.
Repeat all calls learned previously."

"GENERAL REMARKS.—While the squad are at aiming and position exercises the officer takes the opportunity of daily inspecting one squad in them. *He must always pick out some particular point to check, e. g.*, a proper grip with the right hand, pressing the trigger and releasing the spring, making the recruits aim at his eye, &c., &c."

"In order to thoroughly check the aiming of the recruits, it is necessary that the non-commissioned officers should have auxiliary sights with them, which they must always use."

"A particular form of auxiliary sights called the 'Brunn'sche Spiegelapparat' to be had of the Büchsenmacher, Thurath of Stettin is particularly recommended."

EIGHTH WEEK.

"AIMING AND POSITION EXERCISES.—Recruits aim, standing without rest, being checked by means of auxiliary sights, at first without pressing the trigger and releasing the spring, afterwards doing so. Eye to remain fixed on the object."

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(1) "With regard to the meaning of the call which is here translated the 'Attention,' the German Drill Book says:—During the transport of men by rail the men enter the carriages, *on the march they close to the side of the road to clear the way.* 'Commence Firing' is only to be employed on the range to warn the markers that firing is about to commence."

"Footnote adds :—To prevent losing time by fixing the auxiliary sights on every rifle in turn, the non-commissioned officers should make use of one only, to which they can be accurately fitted."

"*The recruits are instructed in method of signalling hits.* The musketry non-commissioned officer of the company begins practising the recruits in firing with 'aiming ammunition' from the aiming rest, auxiliary sights being screwed on." (1)

"TRAINING FOR WORK IN EXTENDED ORDER.—Repeat what has gone before. Movements as a "zug" under the officer, the group leaders being in their places, *over different kinds of ground against a skeleton enemy.* Taking advantage of the ground, if not too damp, raising sights, fire discipline, stopping the firing by the whistle, attack, defence and retiring to be thoroughly practised."

"JUDGING DISTANCE.—Judging distance over most varied ground up to 200 *mètres* by dividing the required distance into equal portions, one of which can be judged with accuracy, or if preferable by finding lateral points to go by."

"THEORETICAL INSTRUCTION. (a.)—By the officer.

'Extended Order,' in new German Drill Book, Part I. §§ 67—80, 127—142. Also how the soldier should conduct himself in the fight.—*Ibid*, Part II. § 57—61."

"Footnote adds—The officer should sift out from the above only just so much as the soldier ought to know."

"(*b*)—By the non-commissioned officer.—Soldier's pay and allowances."

"Footnote adds.—The non-commissioned officers will by this time have so thoroughly instructed their recruits in this matter on pay days, that the instruction in the pay, &c., cannot now present many difficulties."

"Subdivisions of an army corps into divisions and brigades. Repeat the subdivisions of the brigade downwards."

"Houses of the immediate superiors and way to them : position of the different barracks, hospitals, offices, magazines, Government workshops, railway stations and central post offices."

"Footnote adds.—It is to be recommended that in every barrack room a nominal roll of all immediate superiors, especially of those who are stationed in the garrison, should be posted up, also a list of *addresses and a plan of the town*, on which the houses of the above as well as the military and public buildings are plainly marked."

"BUGLE CALLS.—Repeat all hitherto taught."

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"GENERAL REMARKS. * * The officer inspects each squad daily, either on falling in, or during the parade, in the 'present' and in sloping arms, *in order to ensure uniformity in the manual exercise.*"

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(1) "'Aiming ammunition' corresponds to our Morris tube. It is simply an ordinary cartridge case with a cardboard cylinder, about one inch long, containing a small round bullet and some powder in rear, pushed into the top The cylinder is closed at both ends with very thin paper, so that the charge is exploded by the cap of the cartridge case. The bullet fires accurately up to 20 paces"—Tr.

"The non-commissioned officers, *never the lance-corporals*, are in future *to pay particular attention to those recruits who are backward in drill as well as to those who are weak in the manual exercises.* Should other non-commissioned officers of the company on the day on which it does guards, &c., not be on duty it is to be recommended that they should be temporarily told off to the recruits, to help on the more backward." * * * *

NINTH WEEK.

"MANUAL AND FIRING EXERCISES.—Loading, firing, returning to 'ready' and ceasing fire without filling the magazine, &c.: also the same practice two and three men together, shoulder to shoulder, afterwards in file."

"From the middle of the week onwards, practice in loading, firing, &c., individually, and filling and emptying the magazine to be practised."

"Footnote adds—The fully trained soldier must be able to fill the magazine and load his rifle in 25 to 30 seconds and fire 18 to 21 well *aimed shots in the minute.* Recruits, however, are only expected to load in 30 to 35 seconds and fire 13 to 16 aimed shots in the minute."

"Manual and firing exercises by squads in single and double ranks on the word of command, judging the time. Manual and firing exercises individually to be repeated."

"AIMING AND POSITION EXERCISES.—Firing with 'aiming ammunition' under the non-commissioned officer, auxiliary sights being used. The non-commissioned officers of the squads practice their men more especially in position at the rest, also in position standing without rest and kneeling, the auxiliary sights being always used. *Especial attention must be given to those who aim badly: they are to be constantly taken to the tripods and their aim checked.*"

"GENERAL REMARKS. * * Experience teaches that recruits find much difficulty in manipulating the magazine rifle, while during the short hours of drill the time for practically training them in it must necessarily be very limited. It is therefore advisable to have already prepared them theoretically as far as the institution of an hour of theoretical instruction occasionally, during the previous weeks, instead of the popular and customary cleaning and mending hour in the evening, will admit of this being done. During this hour, the non-commissioned officers of squads must, by word of mouth, by illustrations, and by practical work with the magazine rifle, strive to stir the intelligence of the recruits."

"The officer inspects carefully each individual in coming to the 'ready from the slope', and the squad in single rank coming to the 'ready from the order,' judging the time."

TENTH WEEK.

"GENERAL REMARKS.—Only those recruits are to be taken to ball practice who have fulfilled at least twice the conditions of the 3rd class with 'aiming ammunition'."

"Footnote adds—The officer must, as far as possible, have seen each individual man fire with 'aiming ammunition', before he allows him to go to the range to fire with ball."

ELEVENTH WEEK.

"THEORETICAL INSTRUCTION.—(a) By the officer.

The infantry rifle, model 71 84 and its manipulation. Revisal of separate courses of instruction, given by non-commissioned officers."

"Footnote adds—The officer in charge of the recruits must at the inspection show that he is completely master not only of what he has himself had to lecture on, but also of what the non-commissioned officers have had to instruct the men in. It is therefore necessary that he should occasionally with the recruits, go through (in order to get in perfect touch with them) one of the non-commissioned officer's themes for instruction."

"(b) By the non-commissioned officer.

(1) Garrison guard duty. What the man ought to know of relieving guards and sentries. Duties on sentry.

(2) Repeat parts of earlier instruction."

"GENERAL REMARKS. * * Firing with ball will only be so far continued, that fresh attempts will be made to bring on recruits who have not yet fulfilled the 1st practice. Continual and sufficient preparation of these recruits under the company musketry non-commissioned officer, with most thorough checking of their aiming by the officer, is unconditionally necessary."

"Every day the whole of the recruits march singly past the officer, with absolutely correct distances and most accurate covering on the man in front. The officer stands with the metronome in his hand."

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"Everything which will be done at the inspection must be repeatedly gone through from beginning to end. Attention must, at the same time, be given to the non-commissioned officers and lance-corporals, to see that they know what they have to do at the inspection. The officer lectures on the instruction of the 11th week. Non-commissioned officers continue the instruction of the 11th week. Non-commissioned officers continue the instruction of the recruits."

TWELFTH WEEK.

"MANUAL AND FIRING EXERCISES. * * Rapid fire, loading from the pouch, and also using the magazine to be practised with all recruits of company collectively."

"Footnote adds—Before the inspection all dummy cartridges must be examined to see that they can be readily loaded (this to prevent jamming when using the magazine)."

"AIMING AND POSITION EXERCISES.—Firing with 'aiming,' blank and ball ammunition. All the firing positions to be constantly repeated under the non-commissioned officers."

"TRAINING FOR EXTENDED ORDER WORK.— * * Great importance to be attached to a proper use of ground, the various kinds of fire, correctly fixing sights, rapidly ceasing fire and to smartness and rapidity on the part of those extended. The practices to teach the individual soldier what to do (*e. g.* what position to take for firing, what sight to use, on what part of an opponent, whether mounted, standing, kneeling, or lying down, to aim), if *acting on his own responsibility in the fight*, to be continued up to 200 *mètres, over varying ground*, as far as the weather permits."

Such is the laborious yet very practical and expeditious method by which our German friends prepare recruits for their army and some such system must we too adopt if we would insure the successes to which the Germans have attained. Let us then hasten to recognize that there is but the one sound principle on which recruits can be prepared to take their places as *trained soldiers in the ranks*, *i. e.*, if we rightly appreciate what modern science inculcates, *viz.*, "that it is only by the most thorough instruction of the individual that the requisite combined action of members can be attained and that the faulty and incomplete instruction of a recruit, as a rule, affects him during his entire service in the performance of his duties, since faults which are allowed to creep in during the initial stages of instruction are rarely completely eradicated."

The false argument, which is sometimes applied, in favour of handing over the whole of the recruits of a battalion to a young and inexperienced adjutant to receive their training and mark for the rest of their service, *viz*, that it is the only method that will insure uniformity in the instruction of the battalion is best answered by a passage in the translation from which extracts have already been given at great length. This passage runs as follows: "As regards the method of training, the captain is practically unfettered by regulations and no one has the right to interfere with what he thinks fit to do, unless such action is directly contrary to the point of existing regulations or manifestly would give but insufficient results."

In conclusion and in support of the assertion which I have made at the beginning of my paper, viz., that two ideas are surely gaining ground in military circles, whether at home or abroad, (1) that the company is to be the tactical unit of the future, and (2) that the selection of an officer for the post of company commander is a matter of the very highest importance, I would attach a *résumé* of opinions expressed by experienced British officers of high rank at the discussion which followed the paper read by Colonel Lonsdale Hale on the 3rd April last in the theatre of the Royal United Service Institution.

General Sir Arthur Herbert.

"Before we follow the plan adopted by the Germans, the organization of our battalions must be changed. If the companies are to become *quasi*-independent units, the number of companies in the battalion must be reduced. This has for years past been advocated by many officers, but the change has been seriously objected to by many others. If the company is to become a tactical unit, and if the captains are to have the great individual responsibility given by the German Regulations, the strength of each company must be considerably increased."

General Sir Lintorn Simmons, G. C. B.

"Years ago, in this theatre, a lecture was read at which I think I presided, or, at any rate, was present, in which the question was discussed as to the formation of the battalion, and I felt convinced at that time, as I do now, that the best constitution of a battalion for manœuvring in the field is one in which it would be divided into four companies. It has many advantages in other respects."

Colonel Lonsdale Hale.

"We have to wait for a campaign to see how this extreme individualism and excessive subdivision of command will work. We have never seen anything tried in war like the ideal, and may I say the somewhat Utopian system, which has been put before us in this lecture."

Colonel Sir Lumley Graham, Bart.

"We have not had the same advantages as the German army in having to fight against civilized troops, so that we have not learned by experience how necessary many of the reforms were sometimes; and, moreover, what fighting our army has had, and, perhaps, is likely to have for some time to come, has been against an enemy to whom the scientific methods of modern warfare are not always applicable. This is bad for us in some ways; it leads us rather to neglect the modern scientific mode of fighting and to adhere to our old forms, which, under certain circumstances, against the sort of enemy that we encounter, are more advisable. Therefore, I think it is most important that the attention of our soldiers should be frequently called to what is really the scientific mode of fighting, and the mode that we should have to practice if we ever engage against a European enemy. A careful consideration of the German Drill Regulations of 1888, cannot fail to convince us that the Germans have, indeed, cleared their deck for action and thrown all useless lumber overboard!"

(Author of the paper entitled "The recent changes in the drill of the German army," in No. 148 of the Journal of the Royal United Service Institution.)

"Nothing has been retained but what will be of use in, and stand the test of war. * * * Simplicity and uniformity introduced into their drill and training, all non-essentials eliminated, enabling increased time and attention to be devoted to essentials, and thereby facilitating and expediting the re-incorporation of the reserves in time of need; constant and immediate readiness for war at all periods of the training. Such are the principal advantages secured. If this be correct, as I personally believe it to be, the lesson before us English soldiers, is, in all departments and branches of our profession, to go and do likewise."

The same writer in speaking of the general principles of the German system of drill and training thus expresses himself. "There is no 'rule of thumb' "work here. Here we find nothing but living principles, deduced after much thought and labour from real modern war, not by the theorist but by the practical soldier who has proved his quality in field and cabinet, requiring the exercise of reasoning powers and the application of judgment and common sense."

General G. Erskine.

"With regard to the concluding parts of his lecture, wherein he (the lecturer) points to the German army as an example to ours, and calls upon us to follow their example, I have only this to say, that it seems very good advice. I should strongly advocate it myself, but, at the same time, we should not proceed to act upon it without great circumspection, for we must recollect that, what may work very well in the German army, might not be at all suitable to ours. With this reservation, I think his advice is very seasonable."

Captain J. F. Daniell, R. M. Light Infantry. Prize Essay on "Discipline: its importance to an armed force, and the best means of promoting and maintaining it."

Nor should we find the final step, the adoption of the company as our tactical unit, a very great one since the drill and training of to-day has already taken us nearly the whole way. To once more quote what has been so well written on this subject:—"For many years, we have seen old drill formations retained and steadily practised till they were performed with a mechanical precision, day by day, drill season after drill season, these time honoured exercises have been gone through, the reason for them being stated to be that by such means the men were trained in habits of discipline. This was very true so far as it went, but it did not go far enough. Time was when this training was sufficient, but, by degrees, it has dawned on the minds of every one that times are changing and we must change too, that visions of shock tactics were getting dim and faint, and visions of fire tactics becoming clear and distinct and with them fire discipline. We have shaken ourselves free from the idea that shoulder-to-shoulder formations are essential for compactness and steadiness, a more extended order is that to which we have now turned our attention, and this practically means simply dealing with the unit—the individual soldier—instead of with the mass, the battalion or the company in close order. This is the principle which has to be applied to firing, in order to obtain fire discipline, and necessary as the latter is now, the necessity will be even greater when men are armed with a magazine rifle."

Colonel Lonsdale Hale.

"Drill is to be simplified to gain more time and opportunity for thorough individual training, and for more uniform and strict training of the men in fire discipline and the discipline of the combat, and this in future will be from a tactical point of view the test of a well disciplined regiment."

THE HINDUSTANI FANATICS.

BY CAPTAIN A. H. MASON, R. E.

The Hindustani fanatics have been a constant source of trouble and a thorn in the side of the British Government since the annexation of the Punjab, but although they have been the immediate cause of several punitive expeditions against independent tribes on the Peshawar border, yet, speaking generally, their origin and history is but little known, and as far as the writer is aware, no connected account of them has ever been published. For this reason it has been thought that some short description of their rise and of their dealings with the British Government may not be without interest to the readers of this journal. Over and over again have these fanatics received punishment from our arms and yet, as lately as the Black Mountain expedition of 1888, they were still to the fore, and are even now, although with nothing like the power they once had, a factor for mischief in any complications which may arise with the independent tribes on the Peshawar and Hazara frontiers. It is proposed in this article, first to describe the origin of this sect, if such a term may be applied to a band of discontented, fanatical Muhammadans, and then to relate briefly the circumstances under which, on various occasions, they have come in contact with our arms, and their history generally up to the present time.*

About the year 1823, one of those famous saintly adventurers made his appearance on the Yusafzai frontier, who have at all times managed to beguile the credulous and simple Pathan race for their own ends, and have been the means of creating discord, upheaving society, and fomenting rebellions, which have been checked and crushed with the utmost difficulty. This man was Saiad Ahmad Shah of Bareilly. At one period of his life he was the companion-in-arms of the celebrated Amir Khan Pindari, who was himself a Pathan, born in the valley of Buner. Saiad Ahmad studied Arabic at Delhi, and then proceeded to Mecca by way of Calcutta. It was during this journey that his doctrines obtained the ascendancy over the minds of the Muhammadans of Bengal, which has ever since led them to supply this colony with fresh recruits. Although the *Saiad* in after life attempted to disguise the fact, his doctrines were essentially those of the *Wahabi* sect inculcating the original tenets of Islam, and repudiating commentaries on the *Koran*, the adoration of relics, *etc.* It was in 1824 that the adventurer arrived by way of Kandahar and Kabul amongst the Yusafzai tribes of the Peshawar border, with about forty Hindustani followers.

It was just the time to raise the spirits of the Yusafzais and other Pathans (which had been lowered by the crushing defeat they and the

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* In preparing this article the writer has borrowed largely from the "Record of Expeditions against the North-West Frontier Tribes", compiled by Lieut.-Colonel Paget in 1873, and revised and brought up to date by himself in 1884.

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Peshawar *Sirdars* had received from Ranjit Singh at the battle of Naoshera), by religious exhortations.

Saiad Ahmad gave out that he was a man of superior sanctity, and divinely commissioned to wage a war of extermination, with the aid of all true believers, against the infidel; amongst a race so simple and superstitious, the mission of all enthusiasts like Saiad Ahmad is eminently successful. Animated by a spirit of fanaticism, and with the desire of freeing themselves from their Sikh oppressors, a numerous, although ill-disciplined, army was soon at his disposal. His own Hindustani followers had been increased by recruits till they now numbered 900 men. In addition to this, the Peshawar *Sirdars*, feeling the influence of the movement, and hoping to break the Sikh rule, joined in the crusade.

Collecting his army together, and strengthened by the contingents of Khadi Khan of Hund, Ashraf Khan of Zeyda, and the followers of the Peshawar *Sirdars*, the *Saiad* proceeded to Naoshera with the intention of laying siege to the fort of Attock. He found Ranjit Singh warned. Hari Singh with a large army awaited him on the Indus, and Budh Singh was sent across the river with a considerable force. Moving up to Saidu to meet the fanatics, he entrenched his army. The *Saiad* surrounded his force, and in time reduced it to great distress. Budh Singh at length determined to fight, and warning the Peshawar *Sirdars* of the near approach of Ranjit Singh and the fate that awaited them if they acted with Saiad Ahmad, commenced the battle. The *Sirdars* with Yar Muhammad at their head, accepting the warning, fled immediately. This act of treachery had the desired effect, and the Muhammadans were routed with great slaughter by the Sikh soldiery. Yar Muhammad derived little benefit from his act, for Ranjit Singh doubled the amount of the Peshawar tribute, desecrated the mosques, despoiled the country, and ultimately retired, taking Yar Muhammad Khan's son as a hostage.

Saiad Ahmad after this defeat, which occurred in the spring of 1827, escaped with a few followers, *viâ* Lundkhwar, to Swat. Thence he proceeded to Buner, and ultimately, at the invitation of some of the *Khans*, returned to Yusafzai. It leaked out then that the *Saiad's* attempt on Attock had been a failure through the treachery of Khadi Khan of Hund, who had disclosed his intention to Ranjit Singh, and who since the defeat of Saiad Ahmad had withdrawn his allegiance and support from him. The Pathans still believed in his miraculous powers; thousands swarmed round his standard, and being joined by Mir Baba, the Sadum chief, and others, he determined to chastise the Khan of Hund for his misconduct. The parties met, with no decisive result; but by an act of treachery in which he was aided by the late *Akhund* of Swat, the *Saiad* induced Khadi Khan to visit him in a friendly way, and had him seized and slain instantly.

After this he proceeded to Panjtar (see map), and was heartily welcomed by Fateh Khan, the chief of the Khudu Khels. This connection strengthened his position among the Pathans. Aided by Fateh Khan and his own bands of Hindustanis, the *Saiad* commenced a series of exploits which eventually placed the whole of Yusafzai and Peshawar under his control. He subdued the Khans of Hund and Hoti, and levied tithes from the Yusafzai clans. In 1828, by a night attack he defeated the Barakzai force, which advanced against him as far as Zeyda. Subsequently he took possession of Amb. In 1829, having again defeated the Barakzais at Hoti, he occupied Peshawar. But his successful career was now brought to a close. His exactions had become oppressive to the Pathans and an attempt on his part to put a stop to their taking money on the betrothal of their daughters was still more distasteful. There was a general insurrection against him, and many of his followers, including the deputy left at Peshawar, were massacred. Fateh Khan also, having derived every advantage from the *Saiad's* presence at Panjtar, was now desirous of getting rid of his obnoxious ally. He, therefore, joined heartily in the scheme for the assassination of the *Saiad's* followers; but when the beacon was lighted on the top of Karamar, which was the arranged signal for slaughter, Fateh Khan found that Saiad Ahmad and his compact little army of 1,600 Hindustanis under Mulla Ismail, was a force which he dared not attack openly. Finding the Mahaban no longer a safe asylum, the Hindustanis crossed the Indus and proceeded to Balakot. Here the followers of the *Saiad* again rallied round him, and an army under Sher Singh marched against him. In spite of the disparity of numbers, and the warning of his friends, he determined to fight. Three times did his small band of Hindustanis beat back the Sikh regiments. At last, overpowered by numbers, they were defeated and destroyed, only three hundred of their number escaping, the *Saiad* himself being slain.

Of his disciples who escaped with their lives a portion found their way to Sittana. This village had been given as a *muafi* * grant by the Utmanzais to the *Saiads* of Tiringi on their first arrival. The village then belonged to one Saiad Akbar Shah, a man who was held in great veneration by the Utmanzais, Gaduns, and neighbouring tribes, and who was a declared enemy of the Sikhs. Sittana was at that time the refuge for outlaws and offenders from Yusafzai and Hazara, and was the rendezvous of all the discontented *Khans* and their followers. Saiad Akbar had served as treasurer and counsellor to Saiad Ahmad, and on this account he willingly allowed the Hindustanis to gather round him. Here they settled, and established a colony, and also constructed a fort near Sittana, which they called Mandi. After the British annexation of the Peshawar valley, Abdul Ghafur, the well-known *Akhund* of Swat, prevailed on the people of Swat to receive Saiad Akbar as their king and he was accordingly proclaimed King of Swat.

The first occasion of our coming into collision with this Hindustani colony occurred in 1853, after the expedition against the Hassanzais of the Black Mountain, under Lieut.-Colonel Mackeson, C. B. The Hindustanis had then co-operated with the Hassanzais against our feudatory Jehandad Khan of Amb, and had actually seized a small fort of his, named Kotla, in the Amb territory, on the right bank of the Indus, and it was necessary that it should be recovered and restored to the Amb chief. Accordingly, a force was moved to a point on the left bank of the Indus opposite Kotla (see map).

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* Rent free.

None of the tribes around had joined the Hindustanis, but the latter, in answer to the warning to them to withdraw from Kotla to their own settlements gave no written reply, and according to some verbal reports, sent a defiance, Maulvi Inayat Ali Khan, the leader of the Hindustanis, declaring he had come to die.

On the 6th January, with the aid of two boats, a force consisting of two regiments of Sikh infantry, two mountain guns, and two regiments of Dogras of the Kashmir army, under the command of Major J. Abbott, were crossed over the Indus to retake the fort.

In spite of the boasts of the Hindustanis, on the two Sikh regiments and the guns commencing the ascent of the hill on which the fort of Kotla was situated, they lost heart and fled, pursued by some of the people of Amb, who cut down more than a score of them. The rest climbed over a spur of the Mahaban separating Amb from Sittana, and night obliged the relinquishment of the pursuit; but it would have been easy next day to have destroyed their settlement at Sittana which had been abandoned. It was not, however, thought necessary to do this, as it was considered that their flight, without offering resistance, would generally increase the contempt in which they were held by the surrounding tribes, and be more useful to us than any persecution of them could be.

The troops bivouacked for the night near Kotla, and recrossed the Indus the following day.

The only portion of the Peshawar district in which advantage of the Sepoy Mutiny was taken by the people to disturb the country was on the Yusafzai frontier, and this was principally due to the presence of the Hindustani fanatics, who were supported by contributions of men and money, from traitorous princes and private individuals in Hindustan.

The Yusafzai country is controlled by the fort of Mardan, which was usually garrisoned by the Corps of Guides; but in the middle of May 1857, this regiment moved down to form a portion of the Punjab Movable Column, its place being taken by the 55th Native Infantry. At the end of May the 55th Native Infantry broke into mutiny, when about 100 sepoys were put to the sword, and 150 taken prisoners by a column which had moved out from Peshawar under Lieut.-Colonel John Nicholson, some 600 sepoys of the regiment making good their escape to Swat.

Two powers had hitherto reigned in Swat—the *Akhund*, or priest, and the *Badshah*, or king, whom the *Akhund* had set up for carrying on the temporal government (see above). Had these two been united in harbouring the 55th Native Infantry, and at that moment proclaimed a *jahad* against us, there can be no doubt that it would have set fire to the valley of Peshawar, and placed us in considerable difficulties. But Saiad Akbar, the king, had just died. He had long survived his popularity, and had he been then alive, would not have been allowed by the *Akhund* and chiefs of Swat to entertain a disciplined army of Hindustani sepoys. The crisis roused these chiefs to the preservation of their liberties, and they first expelled Saiad Mubarak Shah, the son of the late king, and then the refugees of the 55th Native Infantry, who were conducted by disciples of the *Akhund* through mountain paths to the river Indus, which they crossed at a point far above our territory, with the desperate design of making their way to Kashmir and seeking an asylum with Maharaja Golab Singh; but they were destroyed before they arrived at their destination.

A few of the sepoys of the 55th regiment had, however, shrunk from encountering the perils of the journey to Kashmir, and had joined the young Saiad Mubarak Shah, who had taken up his abode at the village of Panjtar. Not far from this village, at a place called Mangal Thana, a settlement of Hindustanis under some *maulvis* of the *Wahabi* sect had sprung up, being a branch of the parent colony at Sittana. Mukarrab Khan, chief of the Khudu Khel tribe, who succeeded to the position of *Khan* on the death of his father Fateh Khan in 1841, was also hostile to us. In 1857 his cousin Mobaraz Khan invited the Hindustani fanatics under Maulvi Inayat Ali Khan to his village of Chinglai.

It was at this time that some of the border villages began to give way to the influences by which they were tempted to disaffection, and having refused to pay their revenue, they appealed to Mobaraz Khan of Chinglai and the Hindustanis to come down and begin a war for Islam. The defaulting village of Shekh Jana was accordingly occupied by 250 men from Chinglai.

On this being reported Major Vaughan, 5th Punjab Infantry, commanding at Mardan, moved out on the 1st July 1857 with a small force of cavalry and infantry and attacked Shekh Jana, and with slight loss on our side drove out the enemy and pursued them to the foot of the hills.

A fortnight after the affair of Shekh Jana, the Hindustani fanatics, under the leadership of Maulvi Inayat Ali Khan, crossed the border and raised the standard of religious war at the mountain village of Narinji (see map). Narinji is on the extreme border, and, being very difficult of access, had become an asylum for bad characters, and had several times defied the authorities in Yusafzai; at the last moment, however, the *maliks* had always hitherto saved the place from destruction by submission and reparation. The villagers were proud that the place had more than once been attacked by a Sikh force without success.

The number of Hindustani followers with the *Maulvi* was about 150 and he had also some 30 or 40 of the men of the late 55th Native Infantry. The fighting men of Narinji were about 400, and 40 horsemen had joined the party from Panjtar, under the brother of Mukarrab Khan. A few horsemen had also come down from Swat, and several of the fugitives from Shekh Jana were with the *Maulvi*.

On the night of the 18th July 1857, a force of 700 infantry, a troop of cavalry, four guns, and of some mounted levies and police, under the command of Major Vaughan marched from Mardan with the object of surprising Narinji. The village was sighted at day-light on the morning of the 21st. The surprise was complete, the enemy making such hasty preparations as were possible after the troops were seen.

The position of the village was very strong. It was built in terraces, and situated at the foot of a precipitous hill, the rocky spurs of which surrounded it on three sides, but in the front the ground was open and practicable for cavalry. A broad sandy *nala* ran along the foot of the hill, on the other side of which *nala*, facing Narinji, was another range of heights. The slopes of the hill above Narinji were very steep, though practicable for infantry.

Major Vaughan's force was not strong enough to enable him to crown the heights above the village before attacking it in front; moreover, the men had had a long night's march, the season of the year was very trying, and it was not advisable to attempt the long and laborious operation of crowning the heights, or, whilst the enemy's strength was undeveloped, to divide the force. So taking up a position favourable for artillery fire, the mountain guns opened with shot and shell on the place.

The *maliks* had been previously called upon to give up the *Maulvi*, but as in their reply they ignored his presence, the infantry advanced in skirmishing order, and after a tenacious resistance on the part of the enemy, made themselves masters of the lower part of the village, and of the rocks which flanked it. There were several strong breastworks in the upper part of the village, and the enemy, who were very numerous, then pressed down to try and drive the infantry out of the position they had won; but though they fought with great bravery, and some even descended into the plain, they were driven back with loss, and the destruction of the village was commenced. A desultory fire was maintained on the troops from above, whose efforts to destroy the village were thus materially impeded, but soon columns of smoke rose in all directions and the lower village was destroyed.

About 8 A.M. Major Vaughan determined on retiring, as it was not probable that further injury could be inflicted that day.

The troops had been severely worked, and would soon have become exhausted from the almost intolerable heat. To show the trying nature of the weather, it is only necessary to say that the force had forty men, soldiers and camp-followers, struck down by the the sun during the previous day, nine of whom died, including the farrier-sergeant of the Peshawar Mountain Train Battery. The supply of water, too, would have become scarce, as it had to be brought from the villages in rear by the people and on donkeys. The villagers behaved well in this respect, and there was an abundant supply during the time the troops were employed.

The retirement was effected without the slightest opposition on the part of the enemy, although the ground was most favourable for them, and the troops reached their camp at 10 A M.

The losses of the enemy had been severe. Independently of those who must have been killed or wounded by the guns on the higher slopes above the village which the infantry did not reach, fifty of the enemy fell in the lower village alone; many of these were Hindustanis. The wounded were estimated at about fifty more.

Our loss had been five killed and twenty-one wounded.

But the people of Narinji remained stubborn and would not expel the *Maulvi* and soon after a raid was made on cattle in British territory and nothing remained to be done but to renew the attack on that place.

It was known too that reinforcements had been received including Hindustanis from Mangal Thana and Sittana, and on the 2nd August there were 1,000 men in Narinji. Early on the 3rd August, Major Vaughan, who had received reinforcements from Peshawar, for the second time advanced against the village. A force having been detached to take the enemy in flank and rear the main body moved forward and came in sight of Narinji soon after sunrise. As the force approached many of the auxiliaries fled, Maulvi Inayat Ali Khan being among the first to leave the village.

As soon as the main body had come into position opposite the village fire was opened upon it from the guns, which was only feebly replied to. The turning column in the meantime, after encountering determined opposition, had arrived in rear of Narinji, and the village was carried by a simultaneous advance from front and rear.

The work of destruction then commenced. Not a house was spared; even the walls of many were destroyed by elephants. The towers were blown up and the village was soon a mass of ruins. Three prisoners were taken—one was a Bareilly *maulvi*, the second a Chamla standard-bearer, and the third a vagrant of Charouda: they were all subsequently executed.

When the destruction of the village was completed, the troops were withdrawn. Not a shot had been fired at them during the six hours they held possession of the place; nor was a shot fired at them as they withdrew.

At the end of October following the destruction of Narinji related above, Lieutenant J. C. Horne, Assistant Commissioner of Yusafzai, whilst encamped at Shekh Jana with a small escort, was attacked by the Hindustanis and Chinglai Khudu Khels, aided by the Narinji and Shekh Jana people. Lieutenant Horne was forced to fly (as Shekh Jana would not receive him), and take refuge in a ravine. Being favoured by the darkness, he saved his life. All his baggage was, however, taken, and five of his servants were killed. There is no doubt that Mukarrab Khan, and nearly all the *maliks* of Shekh Jana were in league with the fanatics.

To punish this flagrant outrage, Lieutenant-Colonel H. B. Edwardes, the Commissioner of Peshawar, strongly urged that, as soon as troops were available, due punishment should be inflicted for these wanton and unprovoked hostilities.

Accordingly a large force (4,877 of all ranks) under Major-General Sir Sydney Cotton was assembled in April 1858, and advanced across the border into the Khudu Khel country. Panjtar was destroyed and on the 26th April the village of Chinglai, containing about 1,000 houses, was destroyed together with its fort and the crops around.

After the destruction of Panjtar and Chinglai the troops returned to British territory, but on the 28th April Sir Sydney Cotton again advanced into the Khudu Khel country with the object of destroying Mangal Thana, the head-quarters of Maulvi Inayat Ali Khan. On the morning of the 29th April the force arrived at Mangal Thana. Not a shot had been fired at the troops as they laboured up the steep and wooded path, and the fort was found abandoned with every sign of a hasty and recent flight Mangal Thana consisted of two villages, in the upper of which was the fortified house of Inayat Ali Khan, with enclosures for Hindustani followers. Other fortifications had been laboriously constructed of large stones and fine timbers, and the Hindustani fanatics and thieves who flocked to this place must have lived in great enjoyment and security, and it was easy to understand the prestige that surrounded them.

The advanced troops bivouacked at Mangal Thana for the night, the sappers being engaged all night in mining the buildings. At daylight on the 30th April, the troops being drawn off, the mines were fired, and when the dust and smoke cleared away, Mangal Thana existed no longer.

The site of Mangal Thana was probably between 5,000 and 6,000 feet above the level of the sea. The trees grew thickly, and the scenery about it was much like that of Murree.

On the 30th April, the whole of the troops returned to British territory and halted on the 1st May.

It now only remained to deal with the colony of fanatics at Sittana, for which purpose the force, under the command of Major-General Cotton, proceeded towards Khabal (see map), distant from Sittana about four miles, where it encamped on the morning of the 3rd May.

On the evening of the same day the Major-General having reconnoitred the hills and villages of the enemy, determined to make the attack the following morning. Arrangements had been made to attack the enemy's position from the east and south simultaneously, and the enemy was driven from their main position, which they defended desperately, with considerable loss. The fanatics had Pathan allies from the neighbouring Gadun tribe, but their heart was not in the business, and they fled precipitately.

The fighting of the Hindustanis was strongly marked with fanaticism; they came boldly and doggedly on, going through all the preliminary attitudes of the Indian prize ring, but in perfect silence, without a shout or a word of any kind. All were dressed in their best for the occasion, mostly in white; but some of the leaders wore velvet cloaks.

The position of the enemy having been carried at all points, and their villages destroyed, the Major-General determined to withdraw the troops. In the afternoon, the enemy, chiefly Pathans, rallied again upon another height; they had been joined by considerable numbers during the day, but the Major-General, in concert with the Commissioner, determined to adhere only to the object in hand, and not pursue the enemy further into the hills, where the troops would have come in collision with the Gadun and other independent tribes.

As the troops withdrew, the enemy followed up closely, but were kept in check by the rear guard, aided by the fire of two 5½ inch mortars.

It was dusk before all the troops had descended the hill, and the force encamped for the night on the Sittana plain by the bank of the Indus.

Our losses were six killed and twenty-nine wounded, those of the enemy were—Hindustanis fifty, Pathans ten killed. The number of the wounded was not known but the enemy acknowledged that they were numerous. Two Hindustanis were taken prisoners, one a native of Rampur, the other a Bengali, and they were summarily hanged at Sittana. On the 5th the force returned to Khabal, and thence marched to Naoshera, where it was broken up.

As a result of these operations the Utmanzai and Gadun tribes entered into an agreement not to allow the Hindustanis to re-occupy Sittana.

After this the fanatics retired to Malka a village on the slopes of Mahaban, granted to them by the Amazai tribe.

In 1861, however, they again came down to a place named Siri, just over-hanging their old haunt at Sittana, and commenced sending robbers into Hazara to carry off Hindu traders. The offence of the Gaduns was that, in contravention of their agreement, they allowed free passage to the Hindustanis through their territory when proceeding on and returning from their kidnapping and marauding expeditions.

The nature of these outrages is thus described by the Commissioner of Peshawar: "A trader loads his mules at one of our chief towns and starts across country (though there have been extreme cases of the offence taking place on the highroad) to a village he hopes to reach by nightfall. On the road, in some lonely spot, he is seized, gagged, and taken aside into the jungle or some mountain nook, and there kept close under drawn swords till dark, when the whole party starts by well-known, but unfrequented, tracks to the mountainous river bank, where he is ferried across the Indus, and is detained till his relations pay up the required ransom. His chief danger lies in the day dawning, or other obstruction occurring, before the kidnapping party reach the Indus, in which case the encumbrance, in the shape of a gagged idolator, must be got rid of. They might, perhaps, let him go if they could afford it, but the locality and route would be described by him, and individuals perhaps recognized, and so he is knocked on the head, and thrown into a mountain crevice."

In order to bring them to a sense of their responsibilities, the Utmanzais and Gaduns were accordingly placed under blockade, and on the 2nd October 1861 they came in and made their submission, and consented to enter into fresh engagements to exclude the Hindustanis.

During the autumn of 1862, and ensuing cold season, there was a considerable immunity from these kidnapping practices; but on the 5th July 1863, it was reported that the Hindustanis had suddenly reoccupied Sittana. No attempt to prevent their doing so was made by the Gadun or Utmanzai tribe, and some of their members actually invited them. These tribes, being called upon for their reasons far having thus broken the engagements they had entered into, only afforded evasive replies; the Gaduns laying the blame on the Utmanzais, and the Utmanzais on the Gaduns; and as the *Saiads* and Hindustanis were sending threatening messages to our feudatory, the chief of Amb, a blockade of the Gadun and Utmanzai tribes was again imposed, and militia were entertained for the defence of the territory of the Amb chief.

Maulvi Abdulla with his Hindustani followers now commenced to act in the bitterest spirit against the British Government; the leaders of the colony expressly declared that they were embarked on determined opposition to the infidel, and called upon all good Muhammadans to quit the friendship of the unbelieving, and join the would-be martyrs of the faith. A letter to this effect was sent to the chief of Amb.

The neighbouring tribes such as the Hassanzais and Mada Khels, instigated by the *Maulvi* of Sittana, now commenced to give trouble and it was considered that the time had arrived when it became absolutely necessary to have recourse to military operations, as the majority of the Hazara border tribes were now arrayed against the British Government.

An expedition was accordingly sanctioned by the Supreme Government, the first object of which was to effectually rid the frontier of the chronic cause of disturbance—the Hindustani fanatics. Their mere expulsion from the right bank of the Indus back upon their old posts at Malka and on the south bank of the Barandu, was not considered enough; nor was it thought advisable that they should find shelter in Swat, and make that powerful tribe the future focus of disturbance on the frontier. If possible, the line of retreat of the fanatics towards the Barandu was to be cut off; and although their extirpation might not be possible, yet their dispersion would be in lines of direction favourable to their capture, if the co-operation of the well-disposed sections of the tribes could be obtained.

With this object in view it was decided to advance by the Ambela pass into the Chamla valley so as to attack the Hindustanis from the north, and force them to fight with their backs to the plains (see map).

It is not proposed here to enter in detail into the history of the Ambela expedition, the most serious, both as regards the opposition offered and the losses sustained, of the many frontier expeditions which have been undertaken on the Punjab border since the annexation.

A brief summary of the events of the campaign will not, however, be out of place.

On the 20th October 1863, the force under the command of Brigadier-General Sir Neville Chamberlain advanced from Nawakila into the Ambela pass, meeting with but slight opposition. Owing to the difficulties of the road the baggage became blocked and to allow this to come up the force was halted in the pass on the 21st. The following day a reconnaissance was sent forward into the Chamla valley, which was found unoccupied, but on the return of the party they were attacked by large numbers of Bunerwals who had descended from their hills on the north to cut off the retirement of the force. The enemy were repulsed with a loss of three killed and twenty wounded on our side, among the former being an officer. It subsequently appeared that a letter had been sent to the Buner chiefs by Maulvi Abdulla, the leader of the Hindustani fanatics, warning them that although the object of the expedition was ostensibly to punish the Hindustanis, it was in reality to lay waste and annex Chamla, Buner and Swat. This letter, as rousing the suspicions of the Buner people, may have had something to do with the unexpected opposition offered by them.

That the Buner people should thus have taken a decidedly hostile part against us was extremely serious, and not only altered our position in the hills but necessitated a change in the plan of operations.

With a powerful and warlike tribe like the people of Buner in declared hostility on the left flank of the proposed line of march, it was extremely doubtful if the advance into Chamla was now feasible.

Moreover, it was reported that a portion at all events of the Hindustanis had already joined the Bunerwals, so that now they would have to be sought elsewhere than on the spurs of the Mahaban.

In the meantime the communications with the rear had been improved, and the sick together with all spare carriage was sent to the rear. Reinforcements from neighbouring tribes were daily joining the enemy and steps were taken to strengthen the position occupied by our troops on the crest of the pass so as to be prepared to resist all attacks.

On the 26th October the enemy made a determined attack on our position, their efforts being chiefly directed against what was known as the "Eagle's Nest" picquet, but were eventually repulsed with a loss of some 250 killed besides many wounded. Our losses had also been severe and included two officers killed and two wounded. The enemy consisted of the Hindustanis and Bunerwals. Upwards of thirty bodies of the former were counted on the ground after the fighting was over.

It was observed that both the wounded and dead bodies of the Hindustanis on this and subsequent occasions were left by their allies, who seemed to look upon the Hindustanis as they might upon earthen vessels, to be thrown at our heads in the day of battle, when no doubt their utility was appreciated, but of which it was quite superfluous to think of picking up the fragments if they happened to get broken in the fray. But what their allies would not do was performed by our troops; for, under the orders of Sir Neville Chamberlain, these mutilated rebels of our own territories, together with some wounded Bunerwals, were taken into our hospitals and carefully and tenderly treated. Two of the wounded Hindustanis appeared to be soldiers of the late 55th Native Infantry, and many of them were young men, apparently from Bengal; they used the old pattern musket and Government ammunition.

The Hindustani fanatics were under the leadership of Maulvi Abdulla. They numbered at the commencement of the operations about 900 men, most of whom had been wrought up to a pitch of fanaticism, and were all prepared to lay down their lives. It is, indeed, only men animated by this spirit who can be found willing to leave their homes in India, and to take up their residence in these rugged mountains. Widely separated in language, manners, and interests from the people amongst whom they dwelt, receiving only a bare subsistence from the *Maulvi*, who entertained them, and paying exorbitantly for all the supplies they consumed, their life was passed in a manner by no means congenial to natives of Hindustan. They were drilled on our system, and some were clothed like the sepoys of the old Indian army. Three of their *jamadars* had been non-commissioned officers in the late 55th Native Infantry. The *Maulvi* himself had been about four years in these parts. He was the nephew of that Maulvi Inayat Ali Khan who gave so much trouble in 1857 at Narinji (see above), and was a man of good ability. He it was who appropriated all the contributions received from India for the colony, from which he derived a rich income.

On the 26th news was received that the *Akhund* of Swat* had joined, with large contingents of men from Swat, Dir and Bajaur, and it was computed that the total number of men in arms against us now was about 15,000. Old animosities were for the time in abeyance, and, under the influence of fanaticism, tribes usually hostile to each other had joined, or were hastening to join, the *Akhund's* standard, and to fight for the sake of their common faith.

On the 30th October, the first result of the combination between the *Akhund* and the *Maulvi* showed itself. On the right of our position above the main picquets was a high rock, subsequently always known as the "Crag." The ascent to this was most precipitous, but it was found necessary to hold it to prevent it being occupied by the enemy as it was the key of the whole position. About half an hour before daylight on the 30th this picquet was attacked and the small party holding it were overpowered and driven off the rock. Orders were given for the position to be retaken, and after a severe hand-to-hand fight, the enemy were driven out at the point of the bayonet, the position recovered and three standards taken.†

The attack had been made by the Hindustani fanatics, who lost fifty-four killed on the spot and some wounded.

While this fighting was going on attacks had been made on other parts of the camp, but by 10 A. M. the enemy had been beaten off at all points. Our losses during the day had been fifty-five killed and wounded.

Between the 31st October and the 5th November the enemy kept up a desultory fire on our picquets, but on the 6th November a determined attack was made on the troops covering the parties working on the road towards the village of Ambela. This attack was only repulsed after severe loss, including three officers killed and two wounded.

On the 8th and again on the 10th a flag of truce was shown by the enemy, but the war party was still in the ascendant, and nothing was effected.

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* The *Akhund* of Swat was a very remarkable man. Originally a *Saiad* of Buner, he had passed his life in close study and asceticism, and at this time must have been about seventy years of age. He had gained an immense ascendancy over the minds of Muhammadans in general, and more particularly over the tribes on the Peshawar frontier, and his position towards them at this time can best be illustrated by comparing it with that of the Pope of Rome.

† Lieutenants Fosbery and Pitcher subsequently received the Victoria Cross for their distinguished conduct on this occasion.

On the night of the 12th an attack was made on the "Crag" picquet. This had been much enlarged and strengthened since the attack on the 30th October, and the enemy were eventually driven off. The following night the attack was renewed and this time with better success, and for the second time the "Crag" fell into the hands of the enemy. The defenders appear to have been seized with an unaccountable panic, but the nature of the ground and the thickness of the brushwood enabled the enemy to concentrate a large force on the picquet without being observed. Lieutenant Davidson, 1st Punjab Infantry, who commanded, behaved in a most heroic manner, and, after endeavouring in every way to recall the men to a sense of their duty, was killed at his post.

On news of this disaster being received, reinforcements were at once ordered up and the height was stormed and the picquet retaken by the 101st, joined *en route* by detachments from other regiments. The enemy's loss in this affair was 230, 57 bodies being left on the ground. Our loss was 51 killed and 107 wounded.

From the 14th to the 17th November no serious attempts were made by the enemy. On the 18th a change of positions was effected and the whole force was concentrated to the south of the Ambela pass. This movement seems to have led the enemy to suppose that the force was in retreat, and consequently they came down in great numbers and attacked the advanced picquets, but were eventually driven off with a loss of 130 killed and upwards of 200 wounded. Our loss was 43 killed (including four British officers) and 75 wounded. The following day the enemy kept up a fire on the picquets, and we suffered some slight loss including one officer killed and another wounded.

On the 20th the enemy began to collect in large numbers in the neighbourhood of the "Crag" picquet, and having advanced under cover within a few yards of the breast-works, they made a determined attack, and at 3 P. M. they again obtained possession of the post. Two officers whilst endeavouring to rally the men were killed at the breast-works. On the fall of the "Crag" coming to the notice of Sir Neville Chamberlain he ordered up strong reinforcements, and the 71st supported by the 5th Punjab Infantry and 5th Gurkhas stormed and recaptured the position. The commanders of these three regiments were all wounded during the day and Sir Neville Chamberlain also received a severe wound, which subsequently obliged him to relinquish the command of the force, his orderly officer being also wounded.

Thus for the third time the "Crag" picquet was lost and won—a spot which from the heavy losses sustained there on both sides, had become known in the country as *Katlgar*, or the place of slaughter.

The action of the 20th seemed to have had a depressing effect upon the enemy, notwithstanding that they had gained a temporary success, and had wounded the Brigadier-General, which last injury it would have been natural for them to make and think a great deal of. However, from the 20th November to the 15th December (as will be seen hereafter), they made no further attack in force, and at one time their gathering had dwindled down so much, that there appeared a possibility of their giving up the game altogether.

On the 30th November, Major-General Garvock arrived in camp and assumed command of the force which had now been strongly reinforced. In the meantime negotiations had been going on with the enemy, but these having failed, orders were issued on the 14th December for offensive measures to be undertaken the next day. Accordingly at daybreak on the 15th December the attacking force, consisting of 4,800 men, moved out of camp.

The enemy occupied a formidable position, known as the "Conical" hill which was strengthened by stone breast-works offering no ordinary obstacle. Under cover of the mountain guns this position was assaulted and carried at the point of the bayonet, and the enemy were soon in full flight. Fighting continued all day, but by evening the enemy had been driven back in great confusion into the plain below leaving their dead on all sides. The troops bivouacked for the night on the ground they had gained. Our losses during the day had been 16 killed and 67 wounded, while those of the enemy were 400 killed and wounded.

On the following day the force continued the advance and debouched into the open plain and advanced across the valley towards the pass entering into Buner, where the enemy had taken up a strong position.

The village of Ambela was fired *en route* and the troops then advanced against the enemy's position. The brunt of the fighting fell on the 23rd and 32nd Pioneers, upon whom as they advanced the enemy made a furious onset, sword in hand. These regiments, staggered for the moment by the suddenness of the onslaught, turned quickly on their assailants and destroyed the whole of them not allowing one to escape. Upwards of two hundred of their bodies were left upon the field, forty of whom were Hindustanis. Among the casualties on our side, in these two regiments one officer was killed and four wounded. Flushed with success, the pioneer regiments pushed forward into the pass, driving the enemy before them. But the day being far spent, the withdrawal of the troops was ordered, and this was effected without any molestation whatever on the part of the enemy, and the force bivouacked for the night in the neighbourhood of the village of Ambela. During the night the enemy were all in rapid flight towards their homes, and the following morning the Buner *jirga* came in to camp and, not even talking of terms, asked for orders.

They were accordingly required to send a party to completely destroy the Hindustani settlement of Malka, and to see this work properly carried out some British officers were to accompany the party. This was agreed to and late on the afternoon of the 21st December the Buner *jirga* with the British officers arrived at Malka, where they took up their quarters for the night.

Malka was situated on an elevated plateau, on a northern spur of of the Mahaban range. It was a much larger and more substantial place than any known in those hills, containing several large edifices, among which the *Maulvi's* hall of audience, barracks for the soldiers, stabling, and a powder manufactory, formed conspicuous objects. There were no regular fortifications, but the outer walls of the houses were connected, and formed a continuous line of defence with posterns. There was also a tower at the gateway.

The place was found deserted, and on the morning of the 22nd December the whole settlement was entirely destroyed, and the party returned to the camp in the Ambela pass, which was reached on the 23rd, the whole force then returning to British territory.

The total loss on our side during the above operations had been 908 killed and wounded, including 15 British officers killed and 21 wounded.

The loss of the enemy was estimated at 3,000 killed and wounded.

It now only remained to destroy the fort which the Hindustanis had built at Mandi near Sittana, when they had returned in the previous July, and to effect this a brigade was moved to Khabal, and the *jirgas* of the Utmanzais and Gaduns were required to destroy the place. Mandi had been recently much improved and contained some substantial houses. On the 4th January 1864, the whole was destroyed and burnt by the *jirgas*, and the walled enclosure, denominated a fort, was levelled. Sittana was found still a ruin as it had been left by Sir Sydney Cotton in 1858. On the 5th the troops returned to British territory, where the Gaduns and Utmanzais having executed fresh agreements not to permit the return of the Hindustanis to any part of their country, the force was broken up.

The history of the Hindustani fanatics subsequent to the Ambela campaign is not very easy to follow, but it appears that after their expulsion from Malka, the greater number of the fanatics, led by Maulvi Abdulla, retreated into the Chagarzai country, north of the Barandu river. After a time they obtained from the Chagarzais grants of the villages of Tangor and Batora, where they made permanent settlements, and remained undisturbed up to the commencement of 1868. Their position was, however, by no means comfortable. The people amongst whom they dwelt made them pay dearly for the protection afforded them, and for the supplies they received; and it was only by the greatest efforts that their agents in Hindustan were enabled to forward to them sufficient money for their support. They were, moreover, frequently threatened with expulsion by their hosts, who forcibly prevented the completion of two towers which the *Maulvi* had commenced to erect in Batora. The *Akhund* also looked upon them with no friendly eye: their *Wahabi* inclinations were abhorrent to him, and their position in the country was a standing menace; for their leaders maintained their position only by intrigue, and were ready tools in the hands of the rival faction in Buner and elsewhere, followers of the Kota *Mulla*.*

It is not surprising that, with this contant pressure on them, both at home and abroad, the community was several times on the point of dissolution. During the autumn of 1866, Muhammad Isak and Muhammad Yakub, two of their leaders, made several attempts to open communications with Colonel J. R. Becher, C.B., the Commissioner of Peshawar, through the instrumentality of Saiad Muhammad (formerly in our service); their letters were received, and messages sent to them, but their plans were entirely frustrated by the vigilance of Maulvi

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* Kota is a village in the south-west corner of Yusafzai. Saiad Amir, better known as the Kota *Mulla*, was at this time one of the rivals of the *Akhund* in the religious world.

Abdulla, who appears to have gained an entire ascendancy over all the other leaders. Matters remained thus until the beginning of 1868, the fanatics being too much engaged with their own quarrels and intrigues to annoy us or continue the system of highway robbery in our territories, which had first led to the recommendation by the Punjab Government for punitive expeditions in 1858 and 1863.

In February 1868 news was received that the fighting men of the Hindustanis, numbering 400 or 500, had moved from Tangor and Batora to Bajkatta in Buner, on the invitation of Azim Khan of Bajkatta, an opponent of the *Akhund* and firm supporter of his rival, the Kota *Mulla*. Azim Khan offered to give the Hindustanis houses and lands in his village if they would bring over their families and settle there permanently; his offer was accepted, and the fanatics accordingly abandoned Tangor and Batora. Nothing more was heard of them until the 18th of April, when the arrival of Feroz Shah, the son of the last King of Delhi, at Bajkatta was reported by Azim Khan himself, who wrote to the Commissioner of Peshawar to make his excuses for harbouring men whom he knew to be mortal enemies of the British Government. Feroz Shah had arrived some months before at Saidu, the residence of the *Akhund*, in great poverty, and with only four attendants; he was well received, and reported to be in high favour, until the evil news of the arrival in Buner of his countrymen reached the *Akhund*.

The movement of the fanatics into Buner was fatal to them; at a distance they might have been tolerated, and in time possibly have regained their prestige. The *Akhund* now lost no time in exerting all his influence to get rid of what he well knew would be a fruitful source of trouble to him.

By skilful management he was enabled to conciliate and bring over all the Buner tribes of the opposite faction, Azim Khan, Zaidulla Khan, Nawab Khan, and a few other chiefs alone holding aloof. On the 25th of May, at a large meeting of all the Buner tribes convened by Mirji Khan, and most trusted of the itinerant *Shekhs* of the *Akhund*, it was determined that the Hindustanis should be expelled from Buner, their presence being displeasing to the *Akhund* and contrary to the terms of the treaty made with the British Government. In consequence of this resolve, the fanatics, to the number of about 700 fighting men, accompanied by Feroz Shah and Azim Khan, made a precipitate retreat to Malka, where they commenced to rebuild their houses, and made arrangements with the Amazais for supplies. In the meantime Maulvi Abdulla in person visited the *Akhund*, and found means to turn away his anger, for Mirji Khan was recalled, and permission given to the Hindustanis to resettle in Buner. The greater portion of them returned to Bajkatta, but had not been there very long before the intrigues of their leaders again brought them into trouble. Maulvi Abdulla was induced to join a league that had been founded by Azim Khan and other Buner chiefs, together with the Amazais and Mukarrab Khan, ex-chief of the Khudu Khels, to oppose the influence of the *Akhund*, and obtain for Mukarrab Khan recovery of his former possessions and reinstatement at Panjtar. Mukarrab Khan, who, after his expulson from the Totalai villages and the destruction of Panjtar and Mangal Thana in 1858 by our troops, had come into the Commissioner of Peshawar, and been allowed to reside in British territory, was the prime mover in this plot, by which he sought to regain his former position; his money cemented the various alliances, and purchased the neutrality of some of the Buner chiefs. On the 2nd of August Zaidulla Khan committed the first overt act of hostility by seizing a number of Swat traders passing through his lands. The *Akhund* immediately mustered his followers, and directed the Buner tribes to break up the league by expelling the Hindustanis and putting to death the refractory chiefs. In pursuance of his orders, Zaidulla Khan was treacherously assassinated in his own house. On the 12th August they arrived, together with the *Akhund's* followers, before Bajkatta, and sent a message to the *Maulvi*, giving him one day to remove all his followers, women, and children.

The fanatics at first thought of resistance, and exchanged a few shots with the Salarzais, but were induced by Azim Khan to give in and commence preparations for a retreat. The next day the whole body evacuated Bajkatta, the women and children being sent on ahead, and the rear brought up by a guard of fifty or sixty men armed with rifles. For the first few miles all went well, the Buner men being occupied in plundering and burning the deserted settlement; but as the fugitives neared the pass between Bajkatta and Batora they saw that the hills on both sides were held by the *Akhund's* followers. The mass of the fugitives, including Maulvi Abdulla, Azim Khan, and the Buner chiefs, pushed on through the pass, and made their escape with slight loss, but the rear guard was cut off, and, after a gallant stand, entirely destroyed. From Batora the fugitives fled to Gulima Bori, in Chagarzai territory; here they obtained a short respite, and even conceived hopes of being able to establish themselves permanently, being promised support, in the event of an attack, by the Amazais and one section of the Chagarzais.

The power of the *Akhund*, increased by his complete triumph over the rival faction in Buner, was, however, too great for them. The Chagarzais, in obedience to his orders, expelled the fanatics, who continued their flight through Tangor to Bihar, on the right bank of the Indus where they arrived about the 18th of September with some twenty or thirty wounded men. Later accounts of them are very conflicting, but it is certain that the *Maulvi*, with some hundreds of followers, came over to Judba, and that many of them remained there till the British force arrived on the crest of the Black Mountain in 1868. The fanatics were welcomed and given the grant of a hamlet in Judba, and were enabled to purchase several rafts thus getting the command of the river, and making themselves independent of the extortionate Pathan ferrymen whilst at Judba. The *Maulvi* received letters in 1868, it is said, from the Tikari chief, who offered to give the whole body of fugitives an asylum in his fort, and land in the Tikari valley, and also from the Allai *jirga* and the chief of Thakot, who promised to come to Judba to hold a great council and discuss measures of resistance against the British. Mubarak Shah was also summoned, and the war party, cis-Indus, was daily increasing. It seems probable that a month later, the force under Major-General Wilde would have found a powerful coalition and some organized plan of defence, but our rapid approach disconcerting them, the fanatics hastily recrossed the river, deserting their Chagarzai hosts, thereby departing from their profession as soldiers of the faith, and destroying the last remnant of their former prestige, already injured by the treatment they had met with at the hand of the *Akhund* and his disciples. The main body of them then went to Palosi, a village of the trans-Indus Hassanzais, who refused, however, to allow them a permanent settlement. From Palosi they went to Thakot, but, finding no resting-place there, moved down the river to Bihar and Judba of the Chagarzais, and being obliged to abandon this refuge also, they at last threw themselves on the mercy of the Hassanzais. Here they received some land called Maidan near the village of Palosi, which is on the right bank of the Indus, about fifteen miles from Darband. At Maidan they erected buildings surrounded by a mud wall and flanked by towers forming a kind of fort, and here the colony numbering from 600 to 700 lived under their aged chief Maulvi Abdulla, paying to the Hassanzais some Rs. 800 a year as rent for their lands, gardens and buildings.

During the Buner complications in 1885 the Hindustani colony was not actually hostile, but their missionaries were very active and it is probable that had an expedition been sent into Buner, that they would have joined the Bunerwals against the Government, and as a fact they made the probability of such an expedition a reason for asking for contributions from their supporters throughout India.

In May 1885, Maulvi Abdulla sent a letter to the Deputy Commissioner of Hazara, complaining that there was a debt due to the colony of Rs. 8,000 from two men residing in British territory and requesting that the claims might be settled by the Government and threatening that, if this were not done, reprisals would be undertaken. It appeared on enquiry that there was no ground for this claim, and the Commissioner was directed, if he considered it necessary to reply at all to the *Maulvi's* communication, to inform him that letters accompanied by threats could not be attended to.

In the complications with the Black Mountain tribes which immediately preceded the despatch of the expedition in 1888, the Hindustanis took part, and on the 27th June the aged Maulvi Abdulla with 120 Hindustanis from Maidan joined the Hassanzais on the crest of the Black Mountain and in making demonstrations against British territory.

In July orders were issued for the colony of fanatics to be included in the blockade of the Black Mountain tribes. When it was rumoured that an expedition was to be sent to punish those tribes, Maulvi Abdulla held back as far as his profession would allow; and if he did not actually counsel submission he did not encourage opposition, knowing that the brunt of the fighting would fall upon his followers, that the result was a foregone conclusion, and that to stand up and fight meant annihilation. He judged more correctly than the tribesmen that they could not fight against breech-loaders, that the river could be crossed,

and roads blasted out of the rocks where even the country traders' mules could not pass. When the hour of trial came only some 100 of his band joined by a few score of fanatics from among our own subjects and neighbouring clans, tempted fate at Kotkai and charged sword in hand to be mown down like grass. Of the 88 dead counted on the spot where the *ghazi* rush was made during the action of Kotkai on the 4th October 1888, only 48 were identified as Hindustanis. Maulvi Abdulla and the main body watched events from the further bank of the Indus, a sad falling off from their profession of the faith and one which will have the effect of lowering still more their prestige and fame.

Nine days later a force was crossed over to the right bank of Indus, and after blowing up its principal bastions, burned the Hindustani fort and settlement of Maidan to the ground, without a blow being struck in its defence. The colony was completely broken up and Maulvi Abdulla and his following were dispersed among the Chagarzais and neighbouring tribes.

This was the fifth occasion during the past 40 years on which the Hindustanis had come into collision with us; each time they had suffered severely and been obliged to shift their residence, but as it was stated at the beginning of this article they still remain a factor for mischief, although in a less degree than formerly, in any complications which may arise with the independent tribes on this part of the Punjab frontier.*

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* Since writing the above article it has been reported that the Hindustani colony, still numbering some 600, are endeavouring to obtain a settlement on the borders of the Chamla valley in Amazai territory, about five miles distant from Malka, which was destroyed in 1863 during the Ambela expedition, but as far as can be gathered these endeavours have not up to the present met with much success.

THE EFFECT ON CAVALRY OF RECENT IMPROVEMENTS IN FIRE-ARMS, &c.

By Captain G. O'Connor, Queen's Bays.

In common with the other arms of the service, the cavalry are about to enter upon a new epoch, one fraught with enormous consequences either for good or bad.

That the new departure will be to their advantage, is the opinion of many who have devoted time and attention to the subject. On all sides, we see a growing conviction that despite modern arms, cavalry will be called upon not only to assist in producing results on the battle-field, both by the action of large masses and of individual regiments and squadrons, but to so influence the preliminary stages, that the ultimate decision will to a large extent depend upon their services.

To find a parallel with the present high state of excellence and preparedness, imposed by all the principal military nations on their mounted troops, we must go back a century and a half.

That famed military commander, Frederick the Great, with the intuition of genius, had early seen the enormous power inherent in good cavalry. With the time when he commenced to introduce those principles and ideas, which have so successfully stood the test of time and experience, and the present day, a certain resemblance can be traced; then, as now, mechanical and other improvements had brought the infantry nearly to theoretical perfection, and at the same time, great attention was being paid to the mobility of large masses of cavalry with a view to united and overpowering action.

At the beginning of the last century, most of the great battles had been decided by the cavalry: Blenheim, Ramillies, Turin, Almanza and others, all were eloquent of the invincibility of this arm; but at Mollwitz a new era commenced. Infantry marching with great exactness of drill and mobility, and armed with muskets provided with the latest improvements of their time, not only stopped the onset of the successful Austrian cavalry, but after repelling five charges decided the battle.

Whether the defeat of the Prussian cavalry by the Austrian, or the success of the Prussian infantry against the same cavalry, drew Frederick's attention to the necessity of improving his mounted troops, it is impossible to say, but after the first Silesian war, he laid down a system of drill and tactics, the exactitude of the main principles of which are even now incontrovertible; and which at the king's death enabled the Prussian cavalry to boast of the glorious record of 14 pitched battles out of a total of 22, won by them.

From those days until the introduction of rifled arms, although the systems of armament remained the same, and the change in tactics, introduced by Napoleon was in favour of the cavalry,—after a lapse of 100 years, we find the cavalry considered the least important unit in armies, and justifying in every respect the correctness of the views of those by whom they were so lightly esteemed.

The want of energy in the advanced guard duties after the Alma; the supineness of the Light Brigade during the engagement of the Heavy Brigade with the Russians; the Russians repeating their extraordinary mistake of receiving a charge at the halt; and the terrible blunder with the Light Brigade disclosed a state of inefficiency equalled but not surpassed, by the Austrian and French cavalry in the later wars; from this reproach the Prussians should not altogether escape, considering their few successes relatively to the mass of cavalry they brought into the field, and the demoralized state of their opponents.

The poverty of performance by the cavalry in the last great wars, and the terrible loss inflicted on them by the infantry on several occasions, gave rise on the part of various military writers to the opinion, that owing to the increased range and precision of modern fire-arms, a great curtailment of the sphere of cavalry on the actual battle-field had taken place.

With all due respect to this opinion, as far as the infantry are concerned, it is capable if not of actual disproof, of some qualification.

If the assumed curtailment had been attributed to the rapidity of fire of the new weapons, combined with an unreasoning dread (born on the rifle range) of their effect, engendering timid leading, there would have been good grounds for the opinion.

To-day, we are face to face with the results of a quarter of a century of mechanical improvement, all tending in the direction of increased rapidity of fire, until it may be truly said, never before were the infantry, theoretically, so potential in offence or defence. Turning to the artillery, we find them possessing guns of increased range and precision, and animated with a determination to avail themselves to the utmost of their advantages. Still we are given to understand, that, in defiance of these deterrent causes, the sphere of cavalry usefulness has been enlarged not decreased, and that a great day for the cavalry arm is approaching.

To reconcile this apparent contradiction, it is necessary to keep before us, that although the armament of the infantry and artillery has improved, the fundamental conditions of warfare remain the same, the men are still flesh and blood, subject to the same hopes and fears, the same liability to weakness and fatigue, exultation and panic, and that the modification in tactics, the result of recent improved armaments, by giving increased prominence to moral effect, tends distinctly in favour of the cavalry.

Cavalry must never forget that their greatest successes against infantry have been achieved under favourable conditions.

In the belief that the lessons of the past are still valuable as a guide to the future, and to remind cavalry officers that other factors besides armament have to be considered, we will take as illustrations, various representative occasions on which cavalry have been defeated by, or were victorious over, infantry.

Although Europe is much more thickly cultivated now than in the days of cavalry pre-eminence, in the East immense level plains still afford us a fair field. The lesson taught the Afghans outside Fatehabad and Jalalabad, by the cavalry of Sale's brigade, has never had to be repeated.

At Eylau, Augereau's corps was destroyed by the Cossacks, during a snow-storm. At Marengo, Kellerman's cavalry were concealed by vineyards from the Austrians, until the moment of that fateful attack which decided a campaign. At Salamanca, Clausel's division of veteran French infantry, standing with the sun in their eyes and in clouds of dust from the light soil, were simply annihilated by LeMarchant and Anson's cavalry. Murat's successful charge at Dresden was made during heavy rain. At Albuera also, Colborne's British infantry, firm with the consciousness of never having suffered a check, were defeated by the French horsemen in heavy rain. Under cover of the darkness at Vionville, the 6th Prussian Cavalry Division approached close to, charged, and broke some French squares.

From the foregoing it will be seen that weather is an important factor in weighing the probable result of a collision between the mounted and dismounted arms.

The saying that good unbroken infantry can never be defeated by cavalry, is only half true, and like most generalizations requires qualifying. Good infantry, in all formations, have been broken by cavalry, both in the distant and in the immediate past. At Austerlitz, Vandamme's column whilst engaged with opposing infantry, was destroyed by the Russian cavalry. Near Hanan in 1813, 20 squadrons of Russian cavalry broke and captured a French division, formed in eight squares, and supported by 18 guns. An Italian infantry brigade surprised by Austrian cavalry at Custozza, were routed with a loss of four-fifths of their number. At Langalzala also in '66, the Hanoverian cavalry broke two Prussian squares, the infantry being armed with the needle gun. Bredow's brigade at Vionville charged and rode over French infantry in line. At Amiens also the Germans rode down a battalion of marines.

On the other hand, when cavalry action admittedly decided great battles, we find the same cavalry under similar conditions, and frequently under the same leaders, used against infantry but ineffectually.

In former days, although the infantry shoulder to shoulder formation with deeper ranks, and the heavier calibre of their muskets gave a greater weight of metal on a given space, their shorter range necessitated allowing the cavalry to approach quite close, and the difficulty of loading precluded more than one volley being delivered by each rank; yet we see at Salamanca, D'Urban's cavalry defeated with loss by French infantry in line, and at Venta de Pozo, French cavalry after defeating some German and Peninsula horsemen were repulsed by Halkett's infantry in various formations.

The terrible slaughter outside the British squares at Waterloo, shows very conclusively that the effect of a volley, was quite as deadly with what those who had used it fondly called "the Queen of Weapons," as with the present rifle. In connection with the most recent instances of the repulse of cavalry by infantry, we have a clear proof of the effects of rapidity of fire.

The Prussian infantry at Mars la Tour reserved their fire until the French cavalry were within 250 yards, then by rapid firing having nearly annihilated the first line, were still able to fire at the second and third.

In Bredow's charge, the French infantry owing to their fire being masked, were unable to deliver it until the cavalry were close on them, when, if precision had the important effect which is claimed for it one volley would have been sufficient.

The repulse of the French charge at Woerth was effected by rapid independent firing from infantry in retirement. At Mouzon, also by the same means, one company extended beat off a French cuirassier regiment.

The cavalry charges at Sedan afford an exceptionally good illustration of the effects of rapid fire. There everything was in favour of the cavalry, whose approach was concealed from the infantry lines until they were within a short distance of their flanks, and yet, although ridden through with the determination of brave men, the charges were fatal to the cavalry.

Whilst admitting that the successful result of cavalry action against infantry is largely dependent on favourable circumstances, we claim that these circumstances are liable to, and will recur.

With the other arms the result of an attack depends mainly upon the due observance of certain elementary rules, any deviation from which is certain to lead to disaster, but against infantry the result can never be foretold; for instance, when Napoleon ordered the Polish lancers to charge up the pass at Somo Sierra, the wiseacres, who thought it a mad proceeding, little foresaw that it would cause the Spanish infantry to fly from their entrenchments. Had Bredow's charge against Canrobert's division at Rezonville, not taken place, what a different complexion the struggle might have assumed.

That the introduction of repeating rifles and smokeless powder will effect the cavalry revival is certain, but how, and to what extent, is the problem. The clue to this question will be found in summarizing the disadvantages, from the infantry point of view, of the new conditions:—

First.—That owing to the increased range and flatter trajectory of the new weapon, troops will have to assume formations, offering as small a target as possible, at distances hitherto never thought of, thus rendering them particularly liable to opportune cavalry attacks. Already a warning with regard to this has been uttered. The greatest Russian authority on tactics having cautioned the infantry against attempting to repel cavalry in other formations than those, which, bringing as many rifles as possible to bear, will only expose immediately to the attack the smallest possible number of men.

Second.—To allow the soldier to carry the increased number of rounds required in the magazine, the calibre of the bullet has been lessened. An idea was prevalent that this small bullet would not possess the necessary stopping powers against cavalry, but from some experiments conducted in England, at which the Inspector General of Cavalry and several veterinary surgeons were present, the conclusion has been arrived at, that the size of the bullet will make no difference in its effect on cavalry. Despite this *ex-cathedrâ* opinion, there is a lurking belief, that in the mad excitement of a charge, the small bullet will not be able to stop the impetus of an excitable animal like the horse.

Third.—To exercise an adequate control over the natural inclination, with such ready means at hand to get rid of ammunition, increased stringency in fire discipline has to be resorted to. The vast importance attached to fire discipline points this out as the weak spot in the new conditions.

Not only has provision to be made for controlling the men, so that the most important objective for the time being is under fire, but still more difficult, that such an expenditure of ammunition does not take place, as will leave the soldier defenceless at the most critical moment. Coupled with this is the hitherto unsolved problem of the effective supply of ammunition during the ever varying phases of a fight.

The importance of this last condition is evident from one of the avowed objects of magazine fire, that of its efficacy against cavalry. With the exception of the Russians who have not yet adopted a magazine rifle, the other continental powers consider that the magazine, if brought to bear on cavalry when within 250 to 300 yards, will, supposing the attack pushed home, rain such a shower of lead that the attack must needs fail, provided that the magazines are full at the required moment.

With the use of smokeless powder another factor in favor of the cavalry has been introduced. Not only will a better view of the scene of action be obtained, and more opportunities for effective action afforded, but increased moral effect will be brought to bear. Assuming that cavalry will not usually attack infantry unless the latter are engaged with opposing infantry or are under artillery fire; from the moment the infantry become aware that they are the object of a cavalry attack, until the moment when, from their proximity they can open fire on them, the moral effect on the assailed increases in direct proportion to their want of discipline and natural courage.

It is in this, the moral effect of cavalry, that the deductions of the tacticians of the rifle range are so unreliable, very few men are able with equanimity to contemplate the onset of a crowd of galloping horses.

All the recent developments of the fighting strength of nations has tended to make *morale* a factor of increased importance.

In the next great war, the infantry soldier will be without the support of comrades close to him, he will be exposed to unseen and unheard fire besides having longer distances to traverse before seeing the effect of his own fire on the enemy, and no longer will the noise and smoke of his own and comrades' firing give him heart or screen him from view. On the other hand, the cavalryman is less liable to dispiriting moral influences, such as treading on his own dead, and hearing the cries of the wounded; should he come under unseen fire his mobility enables him to avoid the dangerous zone quickly, movement is the essence of his existence, the natural exhilaration of galloping, the closeness of his formation, and the presence of his officers in front, all tend to make him at the supreme moment confident of success.

In short, the conviction that the days of effective cavalry action against infantry have not past is founded on the belief, that with weapons requiring delicate manipulation, perfect discipline, and tactical formations based on intelligence, and great moral courage, the advantage remains with the cavalry. The infantry soldier has not the time or opportunity to acquire the veteran spirit necessary to enable him to use his great advantages with the best effect, and will thus fall a victim to the more natural weapons and applied strength of the cavalry soldier.

ACCLIMATIZATION OF AUSTRALIAN HORSES IN INDIA.

By Veterinary Surgeon (1st Class) W. S. Adams.

I contributed a paper on this subject to the Quarterly Journal of Veterinary Science in India, in July last. It has been suggested to me, that I might offer a paper on the same subject to the Journal of the U.S.I. of India, as it is one of general interest to military officers, as well as to the veterinary profession. In the paper referred to, I dwelt especially on the altered condition of the coat, and the complete change of habit of body which is undergone with regard to this important function. I shall necessarily repeat nearly the whole of my former paper, but I will endeavour to enlarge the subject beyond what I then wrote.

I take the following definition of the term "climate" from the article by J. Henry Bennet, in Quain's dictionary of medicine.

"By climate is now understood those conditions of heat, moisture, atmosphere, wind, soil and electricity which impress certain conditions, uniform even when apparently irregular, on given portions of the earth's surface and which modify, also in a uniform manner, vegetable and animal life."

The possibility of individual "acclimatization" is often denied and is at most very doubtful. From Parkes' Hygiene, in the chapter on climate, I extract the following:—

"The hypothesis of "acclimatization" implies that there is an injurious effect produced, and then an accommodation of the body to the new conditions, within a very limited time, that, for example, the dweller in northern zones passing into the tropics, although he at first suffers, acquires in a few years some special constitution which relieves him from the injurious consequences, which, it is supposed the change at first brought with it. There are therefore, two assumptions, viz., of an injurious effect, and a relief from it. Are either correct?"

I have heard it said, that although individuals do not become acclimatized, that regiments do, by the weakly dying off, or being invalided, leaving only the strongest, thus, from this point of view, acclimatization would simply mean the "survival of the fittest."

However, in dealing with Australian horses imported into India, we shall see that there are certain processes of accommodation of habit of body to be gone through, which must seriously be considered in modifying his treatment on first arrival. Intimately associated with the subject of acclimatization is recovery from the effects of the voyage, but I will for convenience sake, endeavour to keep the two subjects distinct.

Primarily, we shall see at once that the horse is suddenly placed in circumstances which are entirely opposed to what he has been accustomed. The Australian horse in his own country is essentially a grass fed animal, and has been accustomed to almost unlimited freedom, till perhaps shortly before he is put on board ship. His confinement in stable occurs suddenly, on an entire change of food, in a tropical climate. Here we have "new conditions" which must at first be injurious to the horse, independent of the effect of the heat of a tropical climate, which we know has a depressing effect on the system generally, and a stimulating effect on the liver and skin. The accommodation of the habit of body with regard to the coat must be considered a process of "acclimatization." Roughly speaking the horse has four conditions of coat during the year, which nearly correspond to the four seasons. From the following table it will be seen, how exactly opposite these conditions are in the southern latitudes of Australia, and in India.

In India.		In Australia.
Winter Coat......	November	Summer Coat.
	December	
	January	
Shedding Coat...	February	Putting on Coat.
	March	
	April	
Summer Coat.....	May	Winter Coat.
	June	
	July	
Putting on Coat.	August	Shedding Coat.
	September	
	October	

The coat is influenced by the conditions under which the horse is placed, a horse in the rough will naturally carry a far heavier coat than one which is stabled, the climate has also its influence, and lastly, the well bred horse has a much finer coat than the coarse bred one. But all horses no matter how they are bred or how they are circumstanced have on landing in India from Australia the same process of adaptation of habit of body or acclimatization to go through.

For example I will take two shipments of horses. First one which leaves Australia in July, during the Australian winter, the horses leaving with their long coats on. At this season of the year the horse ships make the voyage from Australia to India *viâ* the Torres Straits, which is a longer and hotter passage than across the Indian Ocean, but fine weather is nearly assured. Having had the advantage of making a voyage in a horse ship coming by this route, at this season, I am able to speak from personal knowledge. I made full notes of my experiences which were published in the Journal of the U. S. I. in July last. After leaving Melbourne, as the vessel reached the tropics, the horses suffered greatly from the heat on account of their long coats; on arrival at Madras, at the end of August, 30 days after leaving Australia, some of the horses had entirely shed their coats and all had shed them two or three weeks after landing; this is *fully two months earlier* than the coats would have been shed naturally in their own country. We here see the commencement of the change of the habit of body. This change is rapidly brought about by the almost sudden passage from a cold temperature to latitudes of extreme heat. Horses which leave Australia at this season are sometimes in indifferent condition, owing to the grazing being poor, and the long hot voyage at a time when the horses have their long coats, is very exhausting to the horses, in consequence of which they are often landed in poor condition.

Freshly landed horses having finished shedding their coats in India by the middle or end of September, just at the time our horses are putting on their coats, they carry their sleek summer coats through our cool months, and commence to put on their winter coat about February, when it is getting warm, and have their long coat through our hot season. This, however, is not so heavy as it would have been in Australia, nor is it carried so long, for in July the coats are shed. The sleek summer coat is not retained long, for during September the winter coat commences to show, as is natural to this country, and the horse may be said to be acclimatized with regard to the condition of the coat and the process appertaining to that natural function.

A shipment of horses leaving Australia in December is under exactly opposite conditions. It is then the Australian summer, the horses are at this time generally in good condition, having had the benefit of the spring grazing, they are carrying their summer coats, and the horse ships are at this season able to take the shorter passage across the Indian Ocean. Horses landed in India in January are therefore usually landed in good condition and some are really fat. However, they soon commence to put on their coats and carry it through our hot season which is of course very trying for them and in spite of care some will fall off in condition, but soon pick up again when they have shed this coat. It will be found that those horses which were landed in January, are by the end of August in the same condition of coat as those landed in September. We can therefore at once see that the most favorable time for shipping horses to India, is during the Australian summer, there are, however, difficulties in effecting this, the chief of which is the difficulty in securing freight at this season, as shipping is then taken up by wool, and horses cannot compete with wool.

As I have said above, all horses, no matter at what season of the year they are landed in India, have the same process of accommodation of habit of the body to go through with regard to their coats. The most trying time for them is from March till about June, when the horses have their long coats during the Indian hot season, they are then depressed and there is an evident want of tone in the system, the horses are anœmic, and are prone to œdema of the limbs, and if attacked with "strangles" they are severely affected; the system seems to lack the strength to relieve itself, in the natural manner by the formation of a healthy abscess, but the horse sickens, perhaps the glands round the throat and under the jaws fill and are tender, or may be small abscesses form which discharge unhealthy purulent matter. I have found that to such horses, that are both suffering from the effects of the voyage and are at the same time struggling with the altered condition of coat, the preparations of iron are a necessity, and that the tincture of muriate of iron has an especial beneficial effect, any constipation that may be caused by the iron being easily counteracted by diet.

These horses require to be nursed, or as a dealer once said to me "you must be kind to them," being gradually brought on to their feed and given a full ration of the best grass, it will be found that they require but little physic. My experience tells me that these delicate horses have a great intolerance for aloes, a dose of 3½ drachms being quite sufficient for most horses, and too much for some. I prefer. when a laxative is required, to give linseed oil 12 ounces and aloes 1½ drachms; this I find is quite sufficient for the majority of horses. As recovery from the effects of the voyage is intimately associated with the "acclimatization" of horses, it will be necessary for me to make a few remarks on this portion of the subject. Some horses are landed in an extreme state of debility and exhaustion, from which they are slow in recovering. Recovery is delayed by the change of climate, of food, the alteration of the coat, and often by the horses being infested with parasites. A debilitated horse is sometimes troubled by these last to such an extent as to really endanger life. As the horses improve in health and condition, the parasites have less effect on them and are gradually expelled. Some horses may have insidious disease of the liver or lungs or both, engendered during the voyage, this under favourable circumstances may pass off, but may from some cause become acute and be the cause of death. Fresh landed debilitated horses with an irregular condition of coat, are often the subjects of "ringworm," this is troublesome but not serious, and from its being essentially a disease of debility, as the horses improve in condition the cases become fewer. I have also met with several cases of "pityriasis" or the "bran disease," which is also a disease of debility. It has been suggested to me that in the sudden alteration in the function of the skin we may have a cause of predisposition to the usual skin disease so prevalent in India, and which Mr. Haslam has recently demonstrated to be of a fungoid nature. I have not found this and my experience is that this disease does not show itself in horses till long after the skin has adapted itself to the altered conditions of climate.

After a horse has recovered from the effects of the voyage, changed the habit of body with regard to the coat, become accustomed to the altered condition of feed and inured to the enforced confinement after a life of freedom, he may be said to be acclimatized, as far as it is possible for an exotic animal to be. I am no believer in the idea that residence in any country can give immunity from diseases to which animals in that country are specially liable.

TRAINING OF RUSSIAN COMPANY OFFICERS IN CENTRAL ASIA.

Translated from the Russian by LIEUTENANT A. T. H. NEWNHAM, 10th Bombay Infantry.

The object of the present paper is to set forth certain special points which it would be desirable to take into consideration in carrying out the tactical training of our company officers stationed in Central Asia—special points called for by the peculiar nature of the surroundings of our troops in those parts and the nature of their employment in time of war.

A long course of practice in Central Asian wars has produced, as is well known, a special mode of operations, differing in many respects from that in vogue amongst European armies. Without taking upon myself to enter into a detailed account of steppe warfare I consider it not out of place to touch shortly upon these differences.

Seeing that in our Asiatic possessions nature constitutes herself our chief enemy, the composition of our independent detachments is not of an extensive character, being generally confined to a few companies and sotnias with one or two guns. At the same time in comparison with the European standard the proportion of cavalry is somewhat increased and that of the artillery lessened, while the demand for a sapper contingent becomes most imperative.

In consequence of the scarcity of water, or the possibility of finding it, as often happens, at a considerable depth, it is absolutely necessary to provide a detachment with boring instruments and hoses for the conveyance of water. Occasionally also the indispensability of having with it the means of crossing a river becomes manifest, as for instance when it is necessary to cross mountain streams, which may be (as they are at certain seasons) in a very turbulent condition. The probable scarcity of water and fuel on the route may necessitate the carriage of these necessaries with the detachment, as also a plentiful supply of forage, provisions and other articles required on an expedition. All these conditions add more or less importance to the question of transport, a question which forms such a prominent feature in all Asiatic wars.

In the number of local peculiarities must be included the employment of pack transport, horse or camel, the latter being often most convenient for conveyance of heavy baggage.

The power of calculating the amount of *materiel* necessary to a detachment for crossing rivers or obtaining water is a thing *sui generis* and demands an intimate knowledge of local conditions and wide experience, added to which occasions sometimes arise of having to tell off a detachment into parties dependent on the number of baggage animals available. The comparative importance of transport calls forth a corresponding increase in the number of followers, which sometimes amounts to one-fifth of the entire force. The peculiarities of the climate also demand that especial attention should be directed to the sanitary arrangements, all the more that in consequence of the paucity of numbers and their distance from sources of recruitment every man possesses a special value.

In consequence of local conditions and the character of the enemy, marches are generally performed in a perpetual state of readiness for action, and owing to the paramount importance of transport a march assumes the appearance of a baggage guard. The rear and advance guards are generally speaking of equal strength, and since the entire body is so small the necessity of keeping the enemy in check whilst the main body are getting into fighting order does not arise. There are many methods of conducting the baggage, dependent on whether it is conveyed by wheeled carriage, pack animals or a combination of the two.

Especial attention is directed to the compactness and order of march of the baggage guard, since this immediately affects the depth of the column of march, besides which the pace of the column is in direct proportion to the pace of the transport. Halts and bivouacs are made exclusively when necessity demands, and not in obedience to the general principles of tactics. The length of the march, sometimes between 30 and 50 versts is determined by the distance between wells, places possessing drinkable water and forage for the animals. Acceleration of pace is attained by lengthening the marches and also by giving the men lifts on carts, horses or camels. When the column moves in echelon, the strength of the echelon, and calculations for the march in general are dependent on the distance between wells and their size.

Although the bivouac ought to fulfil both military and economical conditions, yet in choice of this as generally in Asiatic warfare the latter consideration stands first. To fulfil the former, when necessity arises, the men of the detachment of their own accord invent some method to meet the case, and draw up the baggage train in accordance therewith, the method differing in proportion to the size of detachment, nature of locality, object of operations, means in their possession, &c. For guarding the safety of the bivouac Cossack outposts are thrown out.

A small body, about $\frac{1}{10}$ of the entire number of men on duty is appointed for duty for each face of the baggage train; and for looking after the baggage animals, a duty which demands special watchfulness and care, a guard of Cossacks is told off.

Amongst the peculiarities of this kind of warfare, due to the character of the enemy, and his mode of fighting one must remark the absolute necessity of having a small reserve.

The most advantageous method of operations against Asiatic fortresses consists in sweeping with artillery fire the open spaces inside and storming the parapets through breaches.

Such in general outlines are the chief and elementary peculiarities of Central Asian warfare, set forth in this hasty sketch. Warfare in the steppes is a thing so distinct and so difficult, that it deserves the most careful study and investigation. It has been my intention merely to touch briefly here upon that which has universally had a separate place assigned to it in military literature.

In the art of war and partly also in real life, the theory has long been established that in peace time one must practise the principles which one will have to apply in time of war, and that these principles in turn have to undergo certain modifications under the influence of the surroundings. If in addition to this we take into consideration the fact that the enemy with whom we shall have to contend in our Central Asian possessions, as for instance Afghans and Chinese (especially the latter), to say nothing of the English, are far from being beneath contempt, and that to obtain the upper hand of them will be no easy matter, but a task requiring our utmost efforts, it becomes plain that the tactical training of our officers in the above mentioned localities should be established on a basis differing in many respects from that in vogue where European adversaries are concerned.

In Central Asia additional significance is attached to the question of the above mentioned training by the fact that the numerical insufficiency of officers undoubtedly requires to be compensated for by their superior quality. Each officer possesses a greater individual value than with us in Russia and for the same reason also ordinary company officers are often called upon to perform duties, which in European troops would only under exceptional circumstances fall to their lot and are generally carried out by specialists. In view of all that has gone before it would be desirable that the tactical training of company officers in our Central Asian dominions, while fulfilling the general demands of the regulations should be distinguished by the following special points:—

1.—It is necessary that officers who are working at any given branch of tactics should when working out problems apply general principles to the actual local conditions of the place where they are stationed and the enemy they may have to deal with, *par exemple* Chinese or Afghans. All the considerations to be taken into account should be made to correspond thereto, as of course they will be different in many respects from those which come into play in European warfare, for instance calculations as to the time of probable appearance of the enemy (it is scarcely anything out of the common for an Asiatic horseman to accomplish a march of 100 versts in the 24 hours), disposition of bivouacs, order of march, method of operations, &c.

Seeing that in actual reality occasions often arise for acting against fortified Asiatic towns it would be of the greatest possible use to solve problems in this branch of the art of war. In working out problems it would be a good thing to lay stress on the necessity of calculating the amount of transport available under given conditions, the means of effecting crossings of rivers with the materials at the disposal of the force, in a word all those little peculiarities which characterize Asiatic warfare. To launch into a long exposition of the importance of applying the general principles of tactics to local conditions would be unnecessary. It is sufficient to mention that General Annenkoff assigns as one of the chief causes of the first failure at Geok Tepe the employment of tactics, which, though perfectly sound as regards Asia Minor, did not at all fulfil the conditions of Central Asian warfare.

In working out such problems also it would be desirable to have maps of localities more in accordance with the probable scene of operations, whereas the plans now in general use for working out tactical problems are adapted for an European theatre of war, which is a very different matter. The difference is so obvious as to require no explanation.

2.—It is necessary to make our officers acquainted with the armed strengths of our neighbours, and by every means endeavour to facilitate their studying the character of possible enemies, their organization, methods of attack and defence, &c.: to insist on officers making themselves acquainted with military history, in so far as it touches our operations in Central Asia, and the operations of armies in analogous circumstances to our own (the Afghan, Abyssinnian and Egyptian expeditions of the English, European wars against the Chinese, campaign in Algeria, Tonkin expedition, &c.). and theoretically and practically to acquaint our officers with probable theatres of war or at least with our frontier districts. The majority of our officers possess but a scanty store of this kind of knowledge and yet the necessity for it will make itself keenly felt at every step in time of war and the lack of it may result in severe lessons.

It is of course impossible to expect from an officer that he should of his own accord obtain the requisite information, or that he should unaided work at perfecting his military education in his spare time. In our opinion the so called voluntary discussions, which in the present day so often have for their subject topics promiscuously selected and utterly foreign to local interests, should serve as a means for the acquirement of such knowledge, but as it is, in the majority of cases, these discussions are not practical and are carried out in a desultory manner. It should be made compulsory for every officer to attend these meetings and the subject to be discussed should by preference relate to affairs of local and military interest. If it be on the frontiers of India or China, let them first of all thoroughly study these frontiers and future adversaries upon them, and afterwards as additional subjects they can study the organization of the French troops and the conditions of the German frontier. Every kind of knowledge of course is useful, but if a general study permits only of imbibing but a moderate quantity of each, it is better to devote oneself to that branch which is of the most account at the moment. It seems to us that the obligation for every officer to write at least one such paper during the winter course of training would for many reasons form one of the best methods of teaching officers professional knowledge, and awakening a keener interest in the same.

Such in my opinion is a general outline of the course of tactical training which it would be desirable to introduce in the case of company officers serving in Central Asia. Having shown the importance of learning the country, I think it necessary to add that the great difficulty which has already made itself felt and will no doubt again be felt, is the insufficient knowledge our officers have of native languages. In this respect we might well follow the example of the Anglo-Indian army, where, as is well known, it is made obligatory for officers to pass examinations in the native languages, receiving pecuniary rewards for the same, while at the same time the study of Russian is warmly encouraged by the British Government. The latter circumstance is worthy of special attention and should urge us on our part to encourage the study of English by our officers, above all by those serving in Central Asia.

The necessity of having on our Siberian and Turkistan frontiers troops, thoroughly reliable and well acquainted with local surroundings, has long been recognized, for in this way our comparative paucity of numbers will be made up for by their quality, and it seems that one of the best ways of attaining this end, with regard to officers at least, will be the special points proposed above to be borne in mind whilst conducting their tactical training—that is of course with the essential condition that the training shall be regarded not in the light of an unpleasant duty which has to be got through, and takes away time from other and more regular duties or from leisure, but as a matter of genuine necessity.

United Service Institution of India.

PROCEEDINGS of the Meeting of the Council of the United Service Institution of India, held at Simla on the 28th May, 1890.

Present:

HIS EXCELLENCY THE COMMANDER-IN CHIEF, *in the Chair.*

Major-General W. K. ELLES, C. B., *Adjutant-General in India.*

Major-General SIR JAMES BROWNE, K.C.S.I, C.B., R.E., *Quarter-Master General in India.*

Colonel R. C. HART, V. C., R. E., *Director of Military Education in India.*

Lieut.-Colonel P. J. MAITLAND, BO. S. C,

Lieut.-Colonel W. G. NICHOLSON, R. E, *Military Secretary to His Excellency the Commander-in-Chief in India.*

Lieut.-Colonel E. R. ELLES, R. A., *Offg. Deputy Quarter Master General.*

Lieut.-Colonel A. D. ANDERSON, R. A.

Major E. G. BARROW, B. S. C., *Assistant Secretary to the Government of India Military Department.*

Captain A. H. MASON, R. E., *Secretary.*

PRIZE ESSAYS—1890.

SUBJECT:

"THE ORGANIZATION AND EMPLOYMENT IN WAR OF NATIVE CAVALRY."

The following are the conditions of competition :—

1.—The candidates must be Government Gazetted Officers.

2.—The Essays must be legibly written, or printed, not exceeding 32 pages of the size and style of the Journal.

3.—Essays must be received by the Secretary on or before the 1st March 1890.

4.—The Essays must be strictly anonymous, but each should have a motto, and be accompanied by a sealed envelope with the motto written on the outside and the name of the candidate inside.

5.—The Essays will be submitted for decision to referees chosen by the Council.

6.—The name of the successful candidate will be made known at the Annual Meeting in May 1890, and his Essay will be printed in the Journal.

7.—All Essays submitted to become the property of the United Service Institution of India *absolutely*, and authors will not be at liberty to make any use whatever of the Essays without the sanction of the Council.

The report of the referees on the Prize Essays was read.

Resolved.—That in accordance with the opinion of the referees, the "Gold Medal" should be awarded to the writer of the Essay with the motto "*Divide ut imperes,*" (Captain C. M. Maguire 2nd Cavalry, Hyderabad Contingent) and it was decided that, in addition to the Prize Essay, the Essays—

"The worth of the jewel is in the quality of its gems," (Captain A. Masters, Central India Horse), and

"Is it better with the many to follow the beaten track?" (Lieutenant W. W. Norman, 2nd Punjab Cavalry),

Should be published in the journal of the Institution.

The following Essays were also received.

"The help of God and the bravery of man."

Essay with a Greek motto, meaning, "We boast that we are better than our fathers."

"Aide toi et ciel t' aidera."

"Push forward."

"The old order changeth and giveth place to the new."

"As oft as the trumpet soundeth, he saith Aha."

The Council beg to acknowledge the valuable services rendered by the referees.

The Journal
OF THE
United Service Institution of India.

Vol. XIX. 1890. No. 81.

PRIZE ESSAY:—GOLD MEDAL.

By Captain C. M. Maguire,

M. S. C.; 2nd Cavalry, Hyderabad Contingent.

"Divide ut Imperes."

Introductory.

The principles which determine the organisation of Cavalry are based on its employment in war and the training necessary for the purpose. It appears advisable therefore to reverse the order in which the subject has been presented and to consider, first the employment in war of Native Cavalry and then to propose an organisation suitable for it.

The triumph of Cavalry over theorists.

No arm has more successfully defied the attacks of theorists than Cavalry. It is naturally subject to attack as no radical change can take place in the cavalry material—the man and the horse—therefore each technical improvement in the other arms has been hailed as a fresh argument for the abolition of Cavalry. It is gratifying to the Cavalry soldier to observe that, in spite of the attacks of theorists, and the continued progress in the range, accuracy and rapidity of fire, both of guns, and small arms, Cavalry not only retains its place, as an independent arm, but has been increased in proportion to the other arms, in the principal European Armies during the last twenty years.

The influence of modern technical improvements on ideas of Cavalry training has not yet seriously affected the arm.

It is true that many military writers impressed by the improvements in the small arm have recommended a training for Cavalry which would tend to convert it into mounted Infantry. In one case mounted corps armed as Infantry, have been employed on a small scale in uncivilised warfare, and in manœuvres as an auxiliary arm to Cavalry, and in another the Cavalry of one of the great Armies of the world, has been armed with the Infantry rifle and bayonet and trained to act as Infantry as well as Cavalry. These exceptional concessions to theory notwithstanding, Cavalry proper has quite maintained its position as an indispensable arm and there is no apparent probability that it will ever cease to do so.

The improvements in the arms of Infantry and Artillery have changed the principal use of Cavalry from a battle-field to a strategic arm.

The changes which have taken place in the armament and tactics of the other arms have so far affected the rôle of Cavalry that the sphere and objects of its main action have been completely altered. Before the introduction of the breechloading rifle, and shrapnel, Cavalry found its principal sphere of action on the battle-field and it was their achievements as leaders of masses of Cavalry in pitched battles that conferred their fame on Murat and Seydlitz.

Modern examples of Cavalry action in general engagements are unsatisfactory owing to unfavourable local conditions.

It is unfortunate that actual examples from modern war which form the only really reliable source whence to draw lessons for future use throw so little light on the likelihood of successful Cavalry action on the battle fields of the future. In the earlier part of the campaign of 1870 during which period alone regular Cavalry forces were opposed to one another, the battle-fields, with the exception of portions of that of Vionville, were quite unsuited for the action of large bodies of Cavalry. Cavalry was however freely employed against Infantry at Worth, Vionville, and Sedan.

Worth.

The formidable force of French Cavalry (10,000) present under Marshal Macmahon at Worth failed to effect anything. This failure was however certainly as much to be attributed to the extremely unfavourable nature of the ground (there was hardly enough suitable space in rear of the Infantry position for 10,000 Cavalry in rendezvous formation,) as to the steadiness, and good shooting of the Prussian Infantry.

Vionville.

At Vionville a very successful charge was executed by six squadrons of Von Bredow's Brigade against French Infantry, and Artillery.

Sedan.

At Sedan, owing to the enveloping nature of the German attack, the gallant charges of Marguerite's and Gallifet's Cavalry led to no practical result.

General conclusions from the examples cited.

The most ardent supporter of the Cavalry arm must admit that there was nothing in any of these engagements to justify the expectation that in other circumstances, for instance with more favourable ground for its action, and more room for deploying, Cavalry would ever again play the decisive part it did at Zorndorf and Dresden. In a future war it is probable that the introduction of the magazine rifle, and machine guns, as well as the increased attention that has been paid to the musketry training of Infantry, will render the successful execution of such charges as Von Bredow's at Vionville, against unbroken Infantry, more difficult, if not impossible, though no doubt such charges will often be necessary.

Cavalry against Infantry and Artillery.

In saying this the writer is not to be understood to imply that the day of Cavalry charges on unbroken Infantry, or Artillery in action, has passed away. The condition which appears to govern the action of Cavalry against the other arms seems to be that it has only their fire action to fear. Cavalry, especially in small bodies will often be able to take advantage of the fact that troops engaged in one direction have no power to look out for danger in another, and, on other occasions it may, by taking advantage of cover, approach so near the other arms, unperceived, that their fire action will not be able to prevent the charge. Again, bodies of Infantry whose ammunition is expended will be liable to be ridden down by Cavalry. Most of these uses, depending as they do on surprise, cannot be carried out by large forces. The greater the force the more difficult the surprise.

The battle-field uses of Cavalry do not explain the recent increase of the arm.

But even supposing, that effective charges of Cavalry against unbroken Infantry are perfectly practicable, and assuming, that on favourable ground, Artillery is always liable to attack from Cavalry, our arm can only appear in a general engagement as an auxiliary, and dependent as it is, on ground, and circumstances, for effective action, its possible use on the battle-field does not explain the recent great proportionate increase of Cavalry in the continental Armies.

The present rôle of Cavalry—the strategic.

The object aimed at by both Cavalries being the same, the power to execute reconnaissance, it must be fought for.

The advantages of a superiority in Cavalry.

The explanation of this increase is to be found in its employment in the other phases of a campaign. In modern war Cavalry is *par excellence* the strategic arm, its first and principal aim is to gain information, and as a corollary of that,—in fulfilment of the simple principle of preventing the enemy from doing, what you want to do yourself,—to deny it to the enemy. This strategic reconnaissance which is the goal, rather than the field, of Cavalry action, was brought into undue prominence in the campaign of 1870, by the brilliant German reconnaissances which led to the decisive victory of Sedan. Maturer reflection has satisfied military critics that in future wars, it is not to be anticipated that Cavalry will be attached to Infantry* and rendered immobile, as in France in 1870, or almost absent from one side, as in Turkey in 1877-8. At the commencement of a campaign, the Cavalry on both sides will have the same object in view, and that object can only be attained, by defeating the opposing Cavalry, and driving it back on its Infantry. To defeat the enemy's Cavalry, and thus obtain the power of executing strategical reconnaissances, is the chief task of Cavalry in modern war, all its other duties are of secondary importance. Thus a preponderance in Cavalry, whether the victory be gained by numbers, efficiency, or superior handling, means a superiority in information, which, as the example of Sedan proves, exercises a decisive influence on the issue of a campaign. The security conferred by the screening of the advanced Cavalry, might enable a small force, of well trained Infantry, to defeat very superior forces of that arm, as perfectly secure from flank attacks, which are only dangerous to Infantry in the form of a surprise, it could manœuvre freely against the enemy's flanks and thus though inferior in force, develope a superior front of fire to his, and so defeat him.

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* The French Cavalry were attached for supplies to the Infantry.

The paramount importance of the strategic uses of Cavalry is not admitted universally. Raiding, its influence on Cavalry training and organisation.

Although the advantage of gaining a superiority over the opposing Cavalry is generally admitted, it is not universally accepted that this use of the arm is of paramount importance. Many military writers, especially in England, favour the detachment of forces to interfere with the enemy's communications. The advisability has also been recognised of interfering as much as possible with the mobilisation, and concentration, of the adversary's forces, before the actual campaign. The example of the successful execution of such counterstrokes, or raids, is drawn from the success which attended such operations in the American Civil War of 1862-5. It is not always kept in view that during the war referred to, especially good material was available for the formation of mounted infantry, while the absence of a general military organisation prevented their meeting with an efficient resistance. The difficulties attendant on counterstrokes, directed against nations whose defensive forces are properly organised, are generally underestimated. In the first place, it supposes a freedom of disposal of the defensive forces that can rarely be realised by a power obliged to assume that rôle. The menace contained in the counterstroke must clearly out-balance the possible gain attendant on the successful issue of the enemy's operation which it is intended to counteract. The result must be attainable in time, and to be effective, a raiding force must either stop the advance of the adversary's operating force, or cause it to retire to oppose it. Supposing these difficult conditions fulfilled, the operation must be undertaken by the most mobile possible force, therefore cavalry would be detailed, but, as it would be necessary to assume the offensive against infantry, a special armament, and organisation, would be necessary for that arm. The indecisive nature of its fire-action, which is an inherent characteristic of the dismounted action of cavalry, unsuits it for offensive operations against infantry.

The discrepancy in the view as to the primary use of cavalry has given rise to two schools.—
(1). The cavalry.
(2). The mounted infantry.

An undue estimate of the importance of raiding relatively to the strategic use of cavalry has led to a great discrepancy in the views on the training and organisation of the arm. The two conflicting schools may be called the cavalry and the mounted infantry. It is agreed by both that cavalry should be armed with fire-arms; the difference of opinion, (based on the difference of view as to the primary use of the arm) arises as to their use.

The tenets of the cavalry school.

The cavalry school hold that the carbine is necessary owing to the weakness of cavalry on the defensive, and the fact that its action is so often interfered with by the ground. If cavalry could not occupy defiles, defend bridges, guard their cantonments, and do outpost duty at night, they would require a near infantry support, which would destroy the mobility of the arm. This school does not claim independence for cavalry, beyond that degree required for developing the peculiar advantages of the arm; the different arms owe one another mutual support, and, according to the tenets of this school, cavalry should never trench on the sphere of infantry. The supporters of cavalry hold that the essential use of the arm is the combined action of the man, and horse, and that in no case is cavalry justified in acting on foot, when it can act effectively on horse-back. It is further considered that, as confidence in his principal weapons must be the basis of the training in an arm in which the action depends on the personnel, the cavalry soldier must be taught to regard the '*arme blanche*' in a light that would be incompatible with a thorough efficiency in musketry. These views are held in practice by all the great powers of the world. They are however combatted by theorists, and Russia, while professing to hold the same views with reference to the employment of cavalry as the other European powers, has, in addition to the ordinary cavalry training, drilled her cavalry as mounted infantry, armed them with the long rifle, and bayonet, and organised Rifle Brigades to accompany her cavalry divisions on service. The question is one of such importance, involving as it does the fundamental principles upon which the organisation of cavalry is based, that it requires the fullest consideration. The Russian views as to the employment, and organisation of cavalry are further worthy of attention from the facts that the Indian cavalry is not likely to be opposed to to the forces of any other European power, and that the present is a period during which many carefully considered military reforms are being carried out in Russia, the tendency of which is thoroughly practical, and based on the experience gained in the war of 1877-8. In estimating how far the lessons of that campaign serve as a guide for the reorganisation of cavalry it must not be forgotten that owing to the weakness of the Turks in that arm the Russian Cavalry was generally opposed to Infantry.

Generally accepted but combatted by theorists and in practice by Russia.

Importance of the question.

Further reasons for considering the Russian view.

The arguments in favour of arming, and training Cavalry to act when required, as Infantry, appear to be the following:—Cavalry depends for effective action upon favourable ground, it is therefore liable when without fire-arms to be brought to a halt, or caused to make a considerable detour, by small bodies of Infantry, or dismounted Cavalry, judiciously posted, therefore offensive fire-action is desirable. But naturally Cavalry owing to their special training are worse shots than Infantry, therefore when, in addition to that, they suffer from the disadvantage of having an inferior fire-arm, they cannot expect to cope successfully with Infantry. Further, on the offensive with the carbine, an engagement can never terminate decisively in favour of dismounted Cavalry, as the horse-soldier cannot fight on foot with a sword when encumbered by a carbine. These drawbacks disappear when

The tenets of the Mounted Infantry School.

Cavalry is armed with the long rifle, and bayonet. Mounted Infantry of this sort is an independent arm, as well armed as Infantry, and infinitely more mobile. It has already been said that it is the best arm for executing raids; it is also well adapted to the Russian service as the available force of mounted men is very large—on a war footing 1332 Squadrons,—and the men in the regular Cavalry are not very good horse-men. The principal reason which has led to the exceptional armament, and training, of the Russian Cavalry, is the great inferiority of their arrangements for mobilisation, and concentration, as compared with those of Austria, and Germany. The Russian idea appears to be that an irruption of ten Cavalry Divisions, supported by a mobile force of Infantry, probably conveyed on carts, would paralyse the Austrian concentration in Gallicia, and so gain time for the Russian concentration, and secure the initiative for the latter. While making every allowance for the principle that each is the best judge of his own business, such a course of action fails to commend itself in this particular instance as the Austrian concentration would be carried out under the protection of the two great fortresses of Cracow, and Przmysl, and does not appear an example to be followed in any case, as it seems contrary to sound strategy, and to be based on a false appreciation of the most suitable tactical employment of the Cavalry arm. Cavalry becomes exhausted by the mere fact of campaigning owing to the wear, and tear on the horses. While employed in raiding it would further undergo the losses which would necessarily occur in a campaign in which it had to contend on foot with Infantry. These losses are always proportionately much heavier in Cavalry than Infantry owing to the superior relative value of the Cavalry to the Infantry soldier.*

Dismounted Cavalry suffers from the further disadvantage that its effective firing force is much inferior to that of a similar body of Infantry, owing to the necessary detachment for the charge of the horses. These circumstances combine to render the employment of Cavalry to interfere with mobilisation, and concentration, of doubtful efficacy, while its consequence might be such a serious crippling of the arm as would render it difficult, if not impossible, to gain that superiority in the Cavalry combat at the commencement of the ensuing campaign which is almost indispensable for bringing a modern war to a successful issue. In Russia's case the Cavalry, with its supporting Infantry, would have to fight its way through a difficult wooded country occupied by a bitterly hostile armed population the possible result of the operation if successful being the limitation of the Austrian concentration to the line Cracow-Przmysl, the partial destruction of the communications across (from east to west) Gallicia, and the prevention of the mobilisation of troops in the districts over-run. These ends appear of scarcely sufficient importance to justify a course of action which would imperil the success of the entire campaign. In war above all other human undertakings the final goal of the operations must be kept clearly in view. Really decisive results can only be expected from the combined action of the three arms. No example can be drawn from any modern campaign that could justify a commander in exposing one arm to losses in an isolated action, that did not directly further the use of the other two, as the losses sustained might render it unfit to co-operate with them efficiently and so jeopardize the final issue of the war. Though their action is distributed over a much larger area than formerly the three arms must still co-operate with one another. It is not meant that Cavalry, and Artillery are merely auxiliary arms to Infantry. It appears more just to say that a Commander-in-Chief has three weapons at his disposal possessed of different qualities by a judicious combined use of which he can fulfil his task of inflicting defeat on an enemy.

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* Prince Hohenlohe, regarding the matter from the point of view of the state, estimates one Cavalry soldier as the equivalent of twenty Infantry. It is evident that the Prince follows the Hungarian feudal calculation by which one horse soldier was accepted in lieu of twenty Infantry; hence the name Hussar = worth twenty.

Raids against communications are open to the same objections as those against mobilisation and concentration.

The preceding arguments directed against the employment of Cavalry in detached operations against the mobilisation and concentration of an enemy are equally applicable to raids against communications carried out before the Cavalry superiority has been won. Raiding is therefore only a secondary use of Cavalry and the adoption of a special armament and training to further it, as far as it interferes with its preparation for the execution, in the most effective manner, of its primary duties, is contrary to the principle that troops should be organised, and trained, to qualify them for their most important duties The disadvantages of a system which trains the horse soldier to have an undue confidence in his firearm appear even more marked when regarded from the tactical than the strategical standpoint.

Disadvantage of mounted Infantry as great tactically as strategically.

The action of Cavalry.

The advantage of Cavalry lies in rapidity of motion. This rapidity extends both to the march, and the action of the arm in the field, otherwise mobility would serve as an equally strong argument in favour of Mounted Infantry, and the cyclist soldier, whose action is subject to Infantry conditions. Cavalry is the only arm whose essential advantage lies in the offensive. Some superiority or advantage is required to render the offensive practicable for Infantry, or Artillery, but it is the only tactical rôle open to Cavalry.

Let the case be supposed of two Cavalries opposed to one another, at the commencement of a campaign, in front of their respective Armies, one of which has been trained as Mounted Infantry, the other as Cavalry. Here the rôle of both is distinctly offensive, consequently the Cavalry has the advantage, as defensive action is the forte of Mounted Infantry. Defensive action will provide an Army with neither information, nor security, as unless the country is such that all avenues to the front lie through defiles (in which case the example of the passage of the Vosges by the 3rd German Army in 1870 shows that Infantry may have to precede Cavalry) no force immobile in action, as Mounted Infantry is, could prevent the advance of so mobile an arm as Cavalry. Hostile patrols could penetrate and execute reconnaissances behind an immobile screen, besides which, the hybrid arm is by no means so formidable to Cavalry as Infantry is owing to the smaller firing effective, and the liability of the horses to attack. Infantry attached to Cavalry as in Russia, if conveyed on carts, would not sensibly interfere with the mobility of Cavalry though it would increase the difficulty of supply. It would no doubt be useful, as in war troops are always welcome, but it would be more especially so in case of the repulse of the Cavalry. This is defensive action the assumption of which by the Cavalry of either side would be a confession of inferiority and would confer a reconnoitring superiority on the adversary. In every case it would be necessary to furnish an Infantry support to a Cavalry that was driven back, but care would have to be taken not to do so on too large a scale. The side whose Cavalry has been worsted, has met with a distinct reverse, and has lost its immunity from reconnaissance. Substituting Infantry for the Cavalry screen would not fulfil the required object as so large a force would have to be employed, and it would have to be dispersed over so large a rayon, that the Army would be liable to be defeated in detail. The best action for Cavalry and Infantry combined in such a case would apparently be to concentrate in a few favourable positions, and await an opportunity for decisive action, which might present itself from some mistake, or over-confidence, on the part of the enemy.

Infantry attached to Cavalry.

Particular stress has to be laid on the principles which govern the action of Cavalry, as there is a strong feeling in our service, (especially in England,) in favour of increasing the dismounted use of cavalry, and, not long ago, a service paper enunciated that musketry efficiency was the best ground upon which to select Cavalry Regiments for field service. If it could be proved that the mounted employment of the arm is of secondary importance, the Military advisers of the Government should recommend the abolition of the costly cavalry arm, and the substitution in its place of Corps of Infantry mounted on mules, or ponies, who would no doubt be more efficient than Cavalry for dismounted work, as they could devote more time to its practice.

Necessity of laying stress on the principles for the employment of cavalry owing to the prejudice in favour of developing fire-effect.

It will be convenient to recapitulate the various duties to be fulfilled by cavalry in modern war in the order of their importance.

Recapitulation of the duties of cavalry in modern war.

(1).—To defeat the enemy's Cavalry and drive it back on its supporting Infantry. This action covers the movements of the main Army and renders it possible to obtain information.

(1).—To defeat the enemy's cavalry and render reconniassance possible.

(2).—To carry out the reconnaissance of the enemy's troops and dispositions and interfere with and hamper his movements as much as possible.

(2).—To execute the reconnaissance and interfere with the enemy. The strategic uses of cavalry.

These are the duties of Cavalry as a strategic arm.

(3).—Participation in the operations preceding and during an engagement.
The arm of opportunity.

(3).—To act against Cavalry, Artillery, and Infantry during, or preceding, an engagement, This action depends on the ground and attendant circumstances. It is the rôle of Cavalry as the arm of opportunity.

(4).—Miscellaneous uses.

(4).—Cavalry will be employed in pursuits and in covering retreats. It will be required on occasions to sacrifice itself for the other arms. It will be made use of in conjunction with mobile infantry forces in disturbing the communications and supply arrangements of fortresses, such as Paris, the rayons of whch are too great to admit of a complete investment, e. g. the operations of General Gourko against the line Plevna, Orchanie, Sophia in 1877.

(5).—Raiding.

(5).—Cavalry may be required when it has fulfilled its duties in conjunction with the other arms, to act either independently, or along with mobile infantry forces, against weak points in the enemy's country, destroying railways, bridges, and telegraphs, in places remote from the sphere of operations of its main body. It will be difficult for armies that are not unusually well provided with cavalry to make the necessary detachments for this purpose, but its desirability cannot be overlooked, as an efficient offensive includes harassing the enemy in every possible way.

(6).—Divisional Cavalry.

(6).—Divisional Cavalry is attached to Infantry to protect it from surprise, and maintain the connection, between the different parts of an army moving on different roads.

(7).—Continuing to maintain the screen when driven back.

The above are the uses of Cavalry which are either directly offensive, or favour the offensive. As this is the rôle upon which the vitality of the cavalry arm depends, the best expression of which is found in the effective action of the cavalry soldier on horse-back, with the lance, or sword, the development of offensive power should be the first aim of cavalry. But as a General has always to be prepared for a reverse, so Cavalry must be organised, and trained, that, while able to act with the utmost efficiency on the offensive, it may, as a secondary rôle, be able to continue screening its own army as much as possible if driven back. This delaying, defensive action, accompanied as it should be by charges, whenever circumstances admit, can only be carried out by the use of fire-arms, which can only be used legitimately by dismounted Cavalry on the defensive. An attack by dismounted Cavalry requiring as it would manœuvring power, a special armament, and a sufficiently powerful force to form at least two lines, is out of the question for an army whose cavalry has been properly organised and trained. The experiences of the American Civil War of 1862-5 do not refute this view as the lessons drawn from the performances of troops possessed of exceptional qualifications afford no more conclusive guidance for regular armies than the efficiency of Boers against ourselves does in favour of Mounted Infantry.

Magazine rifles unfavourable to the dismounted action of cavalry.

Magazine rifles appear likely to exercise an unfavourable influence on the action of dismounted Cavalry as it will be much more difficult in the future than heretofore to fight indecisive engagements with fire-arms. The dismounted action of Cavalry must always be indecisive, as the absence of bayonets and dependence on the horses make a fight at close quarters out of the question.

The influence of smokeless and noiseless gunpowder on Cavalry.

It is not likely that the introduction of smokeless or noiseless gunpowder will do more to render the cavalry reconnaissance of Infantry more dangerous and less close If it is possible to introduce a noiseless service powder no doubt a heavier fire than at present will be directed against cavalry patrols, but there is no reason to apprehend that the standard of marksmanship will ever sufficiently improve to drive Cavalry from the field.

The question how far India's position renders her an exception to the general rules.

The uses of Cavalry in modern European campaigns having been considered, the question arises, how far India's position renders her Cavalry an exception to the general rules India is in a different situation from the nations on the Continent of Europe who are liable to attack from different directions by various enemies or hostile combinations. India's position is more simple if not less unsafe than theirs as only one of her frontiers is open to an attack by a European enemy. The limits of this essay do not admit of a complete discussion of the strategical conditions of the defence of the Indian Empire. Were space available it could be proved that, in the event of a European attack on the Affghan frontier, we could only gain decisive success by the use of a mobile army, well disciplined, and well led, which would assume a bold tactical offensive, thus enabling us to take full advantage of the superior readiness for war which is the inherent advantage of a long service army, and raising our prestige among the Asiatic nations. This course appears the more advisable when it is considered that the offensive is the most suitable rôle for the large Asiatic force which must form part of our first line for resisting invasion. Besides this, the offensive would enable the most effective use to be made of the Indian Cavalry which could be raised to the European standard by a judicious application of the available material. But whether the offensive-defensive or defensive rôle is assumed by the force defending India the strategical conditions of mountain warfare will prevent Affghanistan proper from being the theatre of the decisive struggle for the Empire of the Moguls. Geographical conditions render it certain that the decisive struggle between the invaders and defenders must take place in a country in every way adapted to the action of Cavalry As such is the case, the Cavalry portion of the force defending India must be prepared to contend against European Cavalry. In no respect therefore does the standard of effici-

Most advisable course in the event of invasion.

The character of the probable theatre of the decisive conflict determines the standard required from our Cavalry, which is that necessary for European war.

ency which should be aimed at in our service appear to fall short of that required to execute successfully the duties incumbent on Cavalry in modern European war that have been set forth above. It has been necessary to consider the strategical aspect of the question as it is only in view of a possible struggle with a European invader that the Indian Cavalry requires reorganisation; and as in war a Commander's plans depend upon the information supplied by the Cavalry its organisation and training must be principally directed towards qualifying it to fulfil the strategic rôle.

As the European standard has to be aimed at, an examination is necessary of the European views as to the employment of Cavalry in war and the organisation adopted to further it.

The German system considered as that of the leading military power, and because we have adapted the German drill and share their views.

Having, it is hoped, established the standard required for the Indian Cavalry, it appears expedient to examine in some detail, the views of the leading nations of Europe, on the employment of Cavalry in war, and the organisation they have adopted to further it. Germany has taken the lead in the reform of cavalry tactics, and organisation; not only has she imparted a careful practical training based on theory to her troops, but she has also proved her system to be the right one by the successful issue of two great campaigns. The German views as to Cavalry further deserve our consideration from the fact that our drill is based on theirs, and we, generally speaking, share their views as to the employment of Cavalry in war.

The reforms of Von Schmidt.

The modern German cavalry reforms are associated with the name of Von Schmidt. He established clearly the necessity for the abolition of useless and complicated drill formations, and movements. Drill has two uses. The first is to communicate the wishes of the commander—the language of command—a knowledge of it is necessary to enable masses to be worked together for a common end. As the language in which orders are given should be clear, simple, and to the point, so ought the movements which respond to it to be free from complications, and adapted to the end in view. The second use of drill is to accustom troops during peace to the formations, and movements, which accompany their action on service. In cavalry therefore the abolition of the unnecessary portions of the drill exercises was to be accompanied by the most rigid precision in the execution of the necessary ones which were retained. Drill has not become less strict but more practical. It is still fully recognised that every consideration is to give way to the maintenance of perfect order. Von Schmidt formulated the principle, before recognised, of the employment of successive lines of Cavalry, in fulfilment of the axiom that the last fresh body of formed troops decides the issue of a cavalry engagement. He considered the first duty of cavalry to be to execute strategic reconnaissances, and screen the main body. For this purpose in a detached Cavalry Division he placed two Brigades in the first line, each with one Regiment in front. Two Brigades covered from 18½ to 27 miles, a Regiment from 9 to 14. Each Regiment had two to three Squadrons in the first line connected together. The second Regiment was 2,800 yards behind the centre of the first. The second Brigade was 8,000 yards in rear of the 2nd line of the 1st Brigade.

These distances were reduced when a collision with the enemy was imminent.

The first line attacked.

The second line covered and supported by a flank attack.

The third line was the reserve.

Von der Goltz Pasha considers Von Schmidt's formation too weak.

Von der Goltz Pasha.

One Regiment, the 1st line—is not enough; and three Regiments—the 2nd line—are too much for one leader to direct. He recommends the formation of lines of Brigades (each Brigade of two Regiments—8 Squadrons). Lines to be of the same strength so as to be used indifferently. Principle for employment,—attack in front combined with attack in flank.

The Regulations of 1886.

Very lately the German view as to formations has altered though their organisation retains the character imparted by Von Schmidt. It has become apparent that though the strategical end to be gained by the employment of Cavalry is as important as ever, yet the means of attaining that end are principally tactical. The tactical use, in fact, over-rules the strategical.

"The more systematically the forces of Europe are organised, the more varied, and numerous, will be the means of defence; the more the Cavalry, especially if confronted by a Cavalry equally well instructed, '*sera genée pour voir.*' It will find it difficult to undertake prompt, and extended movements, and its action, which has been supposed purely strategical, will soon become tactical, that is it will become a combat which will be fought out both on horse-back, and on foot." In accordance with this idea of establishing a tactical superiority over the opposing Cavalry, the German Regulations of 1886 lay down that the first line is the most important, and should consist, of at least half of the available force. The second line ought to prevent the repulse of the first line. It should move directly in rear of the first at wide intervals. These fractions form the protection of the flanks of the first line. As Cavalry has never been employed in this manner in war, practical proof is required before the system can be accepted as of universal application. The flank attack of the old second line is to be replaced by the action of the flank Squadrons of the strengthened first line so the shock both on the front, and flanks, of the opposing first line, will be almost simultaneous, which is an undoubted advantage. It is obviously not intended that more Squadrons than are absolutely necessary should engage with the enemy's first line, as otherwise a cavalry force organised in three lines would defeat a force that was practically without reserves. Such a formation therefore could only be adopted by troops very well led, with subordinate leaders accustomed to use their judgment, and act on their own responsibility. The unfavourable conditions of the theatre of the campaign of 1870 appear to have exercised an influence in favour of the adoption of the new system. At Mars La Tour, in the great engagement between the French and German cavalries, had the German first line been stronger, the issue of the engagement would have been much more decisively in their favour. This fact however is not a conclusive argument in favor of the new formation as had the ground been more favourable the advantage of the then prevailing line tactics might have been apparent. It does however seem that, considering how important an influence the action of the front line must exercise on the whole of the cavalry combat, the cavalry commander's presence with it to direct its action, if not to lead it, is essential. In the new German system one-sixth of the cavalry force forms the reserve which is employed in confirming the success of the other lines and carrying out the pursuit. It is interesting to note that the Russians, who follow the Germans with respect to the employment of the Cavalry Division, keep one quarter of the force in reserve. They recognise however the importance of a favourable commencement to the struggle, and order that, when acting against Cavalry, the opposing force is to be at least equal in front to that of the enemy. Great as the advantage of establishing a superiority over the opposing Cavalry from the very commencement of the engagement undoubtedly is, it does not appear that any essential change has taken place either in the materiel or action of the arm that would justify so complete a departure from the principles established on the experience of previous wars. In any case the new formation is only applicable to a service in which the command arrangements have been thoroughly decentralised.

Views of battle-field action of cavalry.

In addition to its action in front of the Army the modern German view includes an extensive use of Cavalry on the battle-field. Infantry is to be attacked in successive lines, as it is as strong on the flanks as the front; it is to be attacked by the nearest way. Artillery is to be attacked from the front in two lines, the first is to be in single rank to attract the fire of the guns, the second line is to carry out the actual attack, it is to be formed in compact squadrons at wide intervals. In all cases a straight attack is to be practised where possible, enveloping the flanks; there is no time for manœuvring. The ideas of the German Cavalry are expressed in an article in the 'Wochenblatt' of 20th July 1889, in which it is enunciated that Cavalry ought to be convinced that it has the best possible arm, so as to bring on the field of battle the maximum of materiel and moral force and to contend even against Infantry. It is to attain this double object that Germany augments the number of her lancers* and that she has issued the carbine to all her Cavalry. While thoroughly agreeing with the German training and the principle that nothing should be too hard for Cavalry the writer considers that it must be clearly kept in view that the use of Cavalry on the battle-field is of secondary importance. Moreover while admitting that if the necessity arises for such action the German formations appear the best, there is no support from actual experience in war to the theory that even successive squadrons can succeed in riding down Infantry that are not taken by surprise, or Artillery in action when attacked from the front. Granting the improvement of Cavalry in modern times, no sufficiently radical change has taken place in the arm to enable it to succeed in carrying out against the breech-loading magazine rifle, and the machine gun, what the Cavalry that had marched through Europe under Murat, failed to effect against the muzzle-loading musket under Kellerman at Waterloo. The havoc created among the supports and reserves at Plevna by the fire directed on the firing line proves that the attack on Infantry by successive lines is less safe in practice than in theory.

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* The German Cavalry are now all armed with the lance.

Continental views as to employment of Cavalry for secondary uses are usually inapplicable to our service owing to the great difference in force.

In considering how far the continental employment of Cavalry for secondary uses is applicable to our service, due allowance must be made for the enormous difference of effective between a voluntary army such as ours and the conscription-fed hosts of Europe. Our cavalry force will seldom be more than sufficient to accomplish the primary portion of its duties and furnish a sufficient force to act as the arm of opportunity in general engagements. In Europe on the contrary, enormous forces of Cavalry will be present during an engagement, and naturally, cavalry officers are averse to contemplate remaining in inglorious inaction while the other arms are making their most serious efforts.

The organisation of the European Cavalry has been altered to suit modern conditions.

The organisation of the Cavalry in continental armies has been altered to enable it to fulfil the new requirements. The training of Cavalry *en bloc* to adapt it to act in large bodies under one leader became inapplicable when the battle-field ceased to be the chief sphere of Cavalry action. The area of the cavalry engagement is so much greater now than formerly that a change in the system of command has become necessary. In modern Cavalry the subordinate leaders do not carry out the direct orders of the chief of the arm, but they share his responsibility, and co-operate with him. The spirit, end, and general scope of the action of his command, is communicated to the subordinate, the 'how' has to be left to his judgment as he is the person on the spot who will be held responsible. The task of command has become more difficult so that where one skilled leader was sufficient in former wars a dozen are necessary now. As it is universally accepted that officers, and troops, can only be expected to carry out in war, what they have thoroughly practised during peace, the subordinate Cavalry leaders have to be accustomed during peace to exercise independent, responsible, command. Again Cavalry owing to its position as a strategic arm requires the highest training for each individual officer, and soldier, in reconnaissance, and scouting. It has also been recognised that for fighting purposes the gymnastic training of the individual man, his practice in the use of weapons on horseback, and the training, and condition, of the horses are of the first importance A small Cavalry unit is therefore indispensable, alike for officers and men. Germany, the model for the rest of Europe, has selected the Squadron as the unit, a force sufficiently large to

Germany selects the Squadron as a unit.

be a fighting unit, and sufficiently small for its commander to be held responsible for the detailed training of the men, and horses, thereby insuring a high general standard of efficiency. The highest efforts are required from the officers to carry out the individual training of the soldiers, especially the backward ones. It is considered that the greatest efficiency among officers can best be attained by placing under their command, at the very commencement of their service, some definite body of troops, with which they are identified, and for the efficiency of which they are held personally responsible. Command is inseparable from responsibility. The Squadron leader is responsible for everything in connexion with the squadron, even the training of the recruits. The Squadron is divided into four zugs, or pelotons, whose leaders bear the same relation to the Squadron Leaders, that is borne by the section commanders, to Officers Commanding Batteries, in our service. The Officer Commanding the Regiment supervises the training of the Squadrons, and is responsible for the training of the Regiment as a whole.

Higher units in the German service—Brigades—two Divisions an exception.

The Brigade of eight Squadrons is the highest peace unit in the German Army, but two Cavalry Divisions are maintained as an exception.

The maintenance of the Cavalry Division as a peace unit.

The maintenance of Cavalry Divisions during peace is a disputed question. The Russians, and French, have them. The Germans, besides their two permanent Divisions, organise Cavalry Divisions for the yearly manœuvres according to circumstances. The question has recently been discussed at length by the Prince of Hohenlohe-Ingelfingen in his letters on Cavalry. The Prince opposes the formation of Cavalry Divisions during peace on the following grounds.

Prince Hohenlohe opposes it because :

(*a*). A difference in training would arise between divisional Cavalry and Cavalry Divisions.

(*a*). A distinction in training would be made between divisional Cavalry and the Cavalry Divisions.

(*b*). Unsuitable to German territorial system.

(*b*). It is unsuited to the German territorial system.

(*c*). Interferes with the combined training of the three arms.

(*c*). It would interfere with the tactical training of the three arms combined.

(*d*). Cavalry leaders would be difficult to find and would render cavalry a special service.

(*d*). It is hard to find competent leaders. Such special cavalry commanders if appointed would be liable to what in the slang of our service are termed fads, altering unnecessary details in dress &c.

The Prince considers Cavalry should be exercised in Divisions yearly.

Prince Hohenlohe however considers that Cavalry should be exercised in Divisions every year.

Arguments against the Prince's views.

The Prince's opponents would argue that Cavalry, as well as the other arms should be organised in peace in the same manner as in war, and that this is actually more necessary for

Cavalry than the other arms, owing to the share of the personnel in the action of the arm, which depends in Artillery and Infantry on materiel; thus the importance of efficient leading is enhanced.

The objections in detail (*a*). A difference in training would occur between divisional Cavalry and the Cavalry Divisions.

With reference to (*a*) it may be said that (especially in a service like the Indian in which there are obvious objections to localisation,) it would be quite possible for the peace Division to be sufficiently large to contain the service Cavalry Division and the required quota of divisional Cavalry, and train the whole to serve both ends.

(*c*). It would inferfere with the combined training of the three arms.

With reference to (*c*) the Division could if necessary be divided and detailed for tactical training in connection with the other arms.

(*d*). Cavalry leaders would be difficult to find their employment would render Cavalry a special service.

It may be objected to (*d*) that, if it is difficult to find qualified divisional commanders in peace, it would be more so in war, and in any case, the peace training would add to the qualifications of those selected, and enable them to become acquainted with those under their command. It would be the duty of the Inspector-General of Cavalry to keep in his own hands the control over such 'fads', the abuse of which could be injurious to the arm for the technical training of which he is responsible.

The example cited by the Prince of the Prussian Cavalry in in 1806 is in applicable.

The Prince's instance of the comparative failure of the Prussian Cavalry in the campaign of 1806 does not seem applicable to the present day, as the rôle of Cavalry has so far altered that the theatre of its main action lies apart from the other arms. There are at least as strong arguments to be advanced with reference to the necessity for special training, and supervision, for Cavalry, as for Artillery, while the action of the former arm is not so closely bound up in that of Infantry as that of the latter. It is not suggested that Cavalry should be rendered more independent of the general commands of an army than Artillery, but it does appear that it requires quite as much special attention devoted to its requirements, in respect of training, and action, as the ordnance arm.

Little difference exists in the European armies with respect to the service organisation of Cavalry the higher unit of which is the Division, which, while it consists of from two to three Brigades is, in most cases, composed of 24 Squadrons The Cavalry Divisions in any army are formed from the Cavalry which remains from that attached to the Infantry Divisions, a force which varies from half a Sotnia, or Squadron of Cossacks, to each Division of infantry in the Russian service, to a Regiment of four Squadrons, in the German.*

The independent attitude of England and India, its causes.

England alone of the great European powers has retained the regiment as the unit, the squadron existing only as a drill, and manœuvre formation, without a specially appointed commander. This has arisen partly from the fact that England's experience in foreign wars against superior forces badly armed, and of inferior individual value, has led to the retention of the old system of centralisation of command, and partly, because until very recently there were only three squadrons in a regiment, (half the number in Austrian, and Russian regiments,) which rendered it a handy unit. England, with India in her wake, has not yet altered her system to accord with that forced on the continental nations by their experiences in modern war. It is true that Indian Cavalry is organised in squadrons but that unit was originally adopted less with a view to conferring independence on the squadron leader, than to obtain the greatest result from the employment of a few European Officers. This is clearly proved from the fact that the troop is still the adminstrative unit in the Indian Cavalry. While it is generally agreed that on service the squadron leader must be prepared to undertake a responsibility, and enjoy an independence, in some cases even greater, than those of a regimental commander fifty years ago, our organisation has not been so altered as to enable this independence to be realised during peace, and our junior officers qualified to assume it.

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* The writer is not certain that this has not been altered in the regulations of 1886. The Austrians attach three Squadrons to an Infantry Division.

Though there is no essential change in the arm the standard of efficiency of Cavalry has been raised by the character of modern warfare; the attainment of the standard depends on the selection of good subordinate commanders.

Though there is no new gospel for Cavalry the incessant progress of science in the domain of war daily raises the standard of efficiency required for our arm. Cavalry in its present dispersed field of action requires to be better led, more mobile, and better trained than ever during its previous history. It can only be brought to the required standard by the selection, and careful training, of subordinate commanders. The education of the officers for command will have a reflex action upon the men, and render them more efficient. It is a long established military axiom that the better the officers, the better are the men. If an example is required of what can be affected by the adoption of a suitable unit, and the distribution of command, and responsibility, we need only instance the splendid service that the Royal Artillery supplies as an auxiliary to our arm.

The question how far the Indian Cavalry requires reorganisation to raise it to the required standard.

The employment of Cavalry in modern war and the organisation adopted for the arm by the leading European nations having been considered, it is necessary to enquire how far the Indian Cavalry requires reorganisation to adapt it to modern requirements.

The present Indian cavalry.

The Indian Cavalry, as it at present exists, is, with the exception of a few regiments in southern, and western, India, representative of the so-called 'irregular Cavalry' which was raised to assist the English and regular native cavalry in our various Indian campaigns and to oppose the rebels in the Mutiny. At the time when most of the present Bengal cavalry regiments were raised, exceptionally good material was available for the formation of such corps. Led by selected English Officers, and composed of soldiers of an exceptionally high class, it is doubtful whether the term 'irregular' has ever been applied to more useful troops. Judged by the highest of all standards that can be applied to soldiers, that of successfully carrying out every task entrusted to them, no troops have proved themselves better than the Indian Cavalry. It must however be remembered that the standard of efficiency required for the campaigns in which they have hitherto taken part is quite different from that set forth above as necessary for a war under modern European conditions. Indian Cavalry has hitherto been employed as an arm of the battle-field. It has been opposed to inferior Infantry, armed (except in the first Egyptian campaign,) with muzzle-loading small-arms, and to Cavalry, at best only composed of men of the same quality as themselves, with inferior leaders, and training. The Indian cavalry soldier has many qualifications for reconnoitring; he can bear fatigue, he has good eyesight, and a wonderful genius loci. Hitherto in Indian wars it has only been necessary to ascertain the whereabouts of the enemy: the details of his strength, and position have been of secondary importance, as there is but one rule in the strategy of wars against Asiatics 'find the enemy and attack him.' For this no regular reconnaissance is required. Troops cannot be expected to reach a much higher standard of efficiency than that required for their probable action. The service requirements from the Indian Cavalry have hitherto been too low to afford a test for gauging its deficiencies with reference to the European standard in the framing, transmission, and collation, of reports, in regiments so scantily provided with English Officers.

The short comings of the service have been appreciated but they cannot be remedied except by reorganisation.

The short comings of the Indian Cavalry with reference to modern requirements have been fully appreciated, especially by those in high command, and the increased efficiency of the arm has formed one of the most marked features in the general military progress, which has taken place in India during the last few years. It has been recognised that irregular Cavalry, as far as the term applies to the drill, discipline, and action, of the arm, is an anachronism. India now requires a Cavalry, which, with the support of a highly efficient nucleus of English Cavalry, may form part of a force to be opposed, if occasion arises, to an invasion by the picked troops of a great European power. It is the fashion even now to regard the Indian Cavalry as an auxiliary force to the English Cavalry in this country, and requiring therefore only proficiency in scouting, and the other duties of light, irregular Cavalry. However true this may be for small expeditions, it is clear, that in a regular campaign, the English Cavalry in India, 32 squadrons strong, is too inconsiderable a force to dispose of an auxiliary of 155 squadrons. Common sense tells us, that, in case of invasion, the main cavalry force at the disposal of the Indian military authorities, will be Indian, as there will be no other available. The Indian Cavalry therefore requires to be rendered efficient and prepared for immediate action, as a strong Cavalry is indispensable for the assumption of the initiative, which will be of vital importance to us. The inadequate number of English Officers renders it impossible for the Indian Cavalry as at present organised ever to reach the required standard of efficiency.

Two classes of critics contend that Indian troops cannot be brought to the European standard of efficiency.

In stating these views regarding the standard to be attained by our Cavalry which form the basis of this essay, the writer is aware that he is in opposition to two very different classes of critics of the Indian military situation namely :—

(a). English political writers.

(*a*). The English political writers, who have travelled in India, or are content to discuss the question without leaving England. They are unsatisfactory authorities, judging by what they have heard, rather than what they know, and as civilians, and foreigners, unable to grapple with the extremely complex political and military problems which bear on the subject.

(*b*). The Officers of the Indian service who cling to the old system.

(*b*). The officers of the Indian service who cling to the irregular system.

Curious that such different critics should practically agree on this point.

It is strange that the opinions of two classes of critics so diametrically opposed to one another, in their general views, should lead to the same result.

The views of the English political writers.

The English critics consider that the Indian army is not qualified to confront European troops, and that therefore in case of invasion, India will have to rely for military support upon Great Britain. They exempt the best portions of the Indian Cavalry from their criticisms but they clearly regard them merely as auxiliaries. However just their views as to the efficiency of the Indian army may be, the proposal to dispense with its services as a defensive force is neither complimentary to the Indian military authorities, nor realisable in the event of invasion. It is an elementary condition of a sound military system that a country should have within itself an army sufficiently powerful, and efficient, to repel invasion If we are to believe the assurances of all the Governments on the continent of Europe, it is to fulfil this condition alone, that Europe has been turned into a vast camp If the Indian army is not qualified to take its part in a campaign in the defence of the Empire it should be reorganised, and its efficiency raised to the required level. Should this (as is most unlikely) prove an impossibility, the Indian troops must be reduced, and their place taken by English, as national security over-rides all other considerations, and the maintenance of inefficient troops is the worst form of public waste. Judging from the contrast which exists between the native troops in our service with the present limited number of European Officers, and those in the service of the native states, no reasonable person can doubt that with an increased supply of English Officers a great further improvement could be effected in the Indian Army. It must be kept clearly in view that India must rely on her own resources to meet the first shock of invasion. The two army corps available in England, may not be free to proceed to India in many probable phases of a European war: in any case they could only arrive in India some time after the commencement of hostilities. As no other spare troops are ready for immediate service in peace they would not be forthcoming on the outbreak of war. In the question of preparedness for war, we have to deal with facts, and not with theories, or fancies. The campaign of 1870 has shown us that in modern times wars can be lost beforehand. War deals with facts alone, and it has never made any allowance for what might have been. It proves a lack of the elementary knowledge required for treating the question, to neglect the consideration of the political results of a defeat at the commencement of a campaign, in an Empire like ours, (based rather on moral superiority than on physical force), on the disaffected elements among the heterogeneous medley of nationalities included in the 260,000,000 subject to our sway.

These critics would decry the expense of the proposed reorganisation.

A further objection that would be offered by critics of this class to the proposed organisation would be the necessary increased expenditure. Increased efficiency means increased cost. It is by attaining higher efficiency alone that we can expect that approximately the same number of troops as were not long ago considered necessary to garrison India, and furnish small field forces to wage war on neighbouring Asiatic states, are to be rendered capable, in addition to those duties, to resist a European invader. Few who have considered the question can think it possible, that in this military age, a distant, maritime, power can hold a great foreign Empire liable to attack by land, without either having recourse to universal service, or expending the amount necessary for the maintenance of a long service army in the highest state of efficiency

In no case could Cavalry be provided by England.

It is further to be noted that Cavalry is an arm for which it is impossible to rely on England as there would be no supply of trained horses suitable for Asiatic warfare available on the outbreak of war.

(*b*). The critics of the Indian service would urge.

(*b*). The critics of the Indian service would urge that

(1). The success of the irregular system up to date.

(1). Irregular Cavalry has been eminently successful in all the campaigns in which it has taken part :

(2). Rendering it regular will make it less attractive.

(2) Rendering it regular will make the service less attractive and so lower the class of the recruits.

(3). Extra English Officers would interfere with the native officers.

(3). Additional English Officers would limit the sphere and diminish the influence of the native officers and so increase the difficulty of recruiting.

(4). The spirit, and traditions, of the service would not survive a change of system.

(4). Much of the adventurous spirit and many of the traditions of the Indian cavalry service would vanish with a change of system.

(5). Asiatic troops cannot be raised to be European standard.

(5). The Asiatic is so thoroughly different from the European that he requires a different training and standard of efficiency.

These objections considered.

With reference to the above objections it does not seem that there is any real reason for believing that raising the efficiency of our Cavalry to the regular standard will render the service less attractive. The native soldier never objects to a duty which is shared by a British Officer, and the more he is brought into contact with his English superiors the better he becomes. As the appointment of more English Officers is a necessary preliminary to a higher standard of efficiency, in case of reorganisation, the native soldier will be brought more into contact with them. The introduction of a regular system of training would make no further demands on the men's time than the present one. In the training of troops the efficiency and systematic nature of the instruction makes more difference than the actual time devoted to it. The smartest troops are not those who are drilled the longest but those who are instructed by the best men.

The example of the Hyderabad Cavalry proves that the adoption of the regular system does not sensibly lower the class of recruits.

The example of the Hyderabad Cavalry which was converted by Generals Wright, and Sir Charles Gough, from a very irregular force, to as near an approach to the regular, as the small proportion of British Officers admitted, without appreciably lowering the class of recruits, proves that a regular standard is compatible with the advantages that form the excellence of the Indian cavalry. The case of the Turks, and as far as they have gone, of the Indian Cavalry themselves, show that there is no natural defect in the men to prevent their attaining the required standard. It is fortunate that it should be so, as the existence of the Indian Cavalry depends on it. A Cavalry Officer must wilfully blind himself to the defects of our service who considers the Indian up to the level of European Cavalry, yet as we have adopted the European system for our drill, and action, it is fair that we should be judged from that stand-point. Cavalry is an arm that is only maintained for employment in war, therefore its fitness for service is its raison d'etre. In desiring a reorganisation for our service we wish for as little change, as little departure from traditions, as is compatible with the improved efficiency which is the condition of our existence.

Defects in the organisation of the Indian Cavalry when viewed from the European stand-point.

When examined from the European stand-point the present organisation of the Indian Cavalry appears to labour under the following disadvantages.

(*a*). An absence of higher organisation.
(*b*). The Regiment is the unit and not the Squadron.
(*c*). Squadron Officers have no definite command.
(*d*). The Troop leaders are not qualified for their positions.
(*e*). The cavalry is too light.

The first four defects practically render careful individual training impossible,—to consider them in detail.

(*a*). The absence of higher organisation.

(*a*). The Regiment is the largest cavalry unit. Including the Guides, there are fifty Cavalry Regiments serving in India, 8 English, and 42 Indian. Until the recent appointment of an Inspector-General, Cavalry was only subject to inspection by the General Officer Commanding the Brigade or Division in which it chanced to be quartered, who in two cases out of three was not a cavalry officer. Even now fifty distinct bodies are too large a force to admit of a sufficiently searching examination by the Inspector-General of the individual training of the ranks. The task appears especially heavy when it is considered that the Inspector General has further to consider the alterations in drill and training required to keep pace with the times, and to arrange for, and superintend, any camps of exercise, at which large bodies of Cavalry may be present during the drill season. Besides this were a large cavalry force mobilised in India it would be difficult to find officers qualified to command Brigades, and Divisions, as the camps of exercise held in this country have not been sufficiently frequent to supply the experience, and knowledge of the troops, that would be conferred by permanent command. It is not meant to imply that there are not many officers in our service in every way fitted to exercise command, but this difficult duty requires practice as much as, if not more than, any portion of the military training, and it is quite certain that however gifted an officer may be his efficiency will be increased by its exercise.

(*b*). The Regiment the unit not the Squadron.

(*b*). This disadvantage has been already alluded to; the regimental system is only adapted to training '*en bloc*.'

(*c*). Squadron Officers have no definite command.

(*c*). This is a serious drawback. A Squadron Officer is in an anomalous position as he is intrusted with no definite command. The essence of this defect lies in the fact that the Squadron Officer is not prepared for the command of a squadron. An officer should at first be given a small command and be thoroughly competent to exercise it, before advancement to a higher responsibility. No man can be expected to be a thoroughly good squadron commander who has not first commanded a troop.

(*d*.)—The troops leaders are not qualified for their positions.

(*d*).—This is the most serious defect in the existing organisation, and its discussion is beset by many dif ficulties; however the question is of such importance that it must be fully and candidly considered.

The importance of the native officer.

The native officer has always been an important factor in the Indian Cavalry. He assisted in raising the irregular regiments, smoothed the difficulties which arose between the foreign officers and their men, guided his English superiors with reference to the public opinion of the native portion of the regiment, and managed those details of interior economy which are unsuited for the interference of the English officers. The native officer has always been, and is now, quite indispensable. The question however is whether he is qualified, or can be rendered so, to train, and lead, his

Whether qualified to be entrusted with command.

troop and perform all the duties, required from a troop leader in modern warfare. In the old days the native troop leader had merely to be a brave man, and ride straight. These are certainly necessary qualifications for a cavalry officer, or soldier, now, as then, but they are not more than the preliminary requisites for the cavalry officer of the present day. Although cavalry drill has been simplified, the increased independence, and responsibility, that has devolved upon subordinate officers, has rendered their task far more difficult than it was under the old conditions of warfare. Taking these difficulties into consideration, and the peculiar personal nature of the cavalry arm, in which the living material—the men, and the horses,—are as it were the ammunition, it is impossible for the mental standard of its officers to be too high. Resolution, energy, and that power of leadership, which commands the confidence of the men, are the great requisites. These are qualities which training can enhance, but cannot impart. The course of action has to be determined upon with lightning rapidity, often upon imperfect knowledge, and, even if it subsequently proves mistaken, it must be persevered with unflinchingly, as there is no time for going back in cavalry action, and boldness of execution will often compensate for a fault in design. If we consider how often a cavalry leader may have but a few seconds in which to weigh the sacrifice of himself, and his command, against a possible, seldom certain, advantage, the difficulty of the position will be apparent. The leader of a small cavalry force gains unperceived, a position near the flank of a line of guns; they are escorted by Cavalry, but he sees that by detaching part of his command against the escort, and executing a prompt, simultaneous charge on both escort, and guns, he may silence the latter. He, and his force, will be lost,—ammunition expended,—but the gain to the army may be incalculable. We must have cavalry leaders, able to see such opportunities, and take advantage of them resolutely. We, English Officers, have to ask ourselves whether we are altogether fitted for the position of leaders of Cavalry in the warfare of the present day, though we are superior in race, class, and education, to native officers. It must also be remembered that we have never fought an unsuccessful, or even a defensive, campaign with native troops. In the hour of reverse we require some surer ground to support our officers than the attachment to their cloth felt by foreigners serving an alien government. This does not affect the men whose cohesion would be secured by the concrete sentiments, of fidelity to their officers, and esprit de corps, rather than the abstract idea of devotion to a Government which might appear to be tottering. Notwithstanding the great popularity of the service, it will be difficult enough to obtain really good, well trained, cavalry officers from England, yet, national prejudice apart, it must be admitted that we are more likely to find the stuff from which good cavalry leaders may be formed in the upper classes of one of the great fighting nations of the world, men in whose veins flows the blood of those who led the English soldiers at Blenheim, Waterloo, and Balaklava, than from the ranks of an Indian cavalry regiment. It

Qualifications in former days.

The modern standard.

may be objected that the lead of a troop is too unimportant to be affected by such considerations. It does not appear so. In the various phases of a modern engagement the troop leader becomes the squadron leader, even the line leader. In reconnaissance the troop leader may be called upon to furnish a report on some particular position or locality. The ideal cavalry officer for this purpose would be one whose reports placed the general in command in possession of as much information as if he had visited the place reported on himself. Those who know the native officer will appreciate how far such a standard is beyond him. His general education is insufficient to admit of the attainment of high technical acquirements The native officer is no less unfit for so responsible a position on service than he is to be entrusted with the training of his men during peace. He is an excellent subordinate, executing precise orders to the best of his ability, but he is seldom qualified to be permitted to act on his unaided judgment. Definite instructions cannot be given for such an arm as Cavalry, the position of which varies at every moment, with reference to the general situation. There are certainly exceptional native officers who are perfectly qualified to be entrusted with the command of troops, but such are few and far between, and no organisation can be based on exceptions. Besides, however efficient a native officer may be, he never commands the unquestioning obedience, and confidence, of his men that a British officer does. The Indian soldiers regard the native officer as one of themselves and do not look up to him as a person of superior class, and nationality, to themselves. History too condemns Asiatic leadership. The long series of reverses, sustained by Asiatics, in war against Europeans, have been due to defective leading, rather than to a lack of military qualities, and it was bad generalship, rather than want of bravery, that subjected the great military nations of the East to a European rule. The most serious defects of the native officer being due to character rather than defective knowledge, education cannot remove them though no doubt it would render them less glaring. Those who admit the short-comings of the native officer have suggested two methods of obviating them—

Short-comings of the native officer.

Defects of native officer due to character; therefore ineradicable.

Suggested measures for obviating the defects of the native officers.

(*a*). Adding English troop leaders during war.

(*b*). Inducing native gentlemen to qualify themselves for the position of officers.

(*a*). Adding English Troop leaders during war.

(*a*). This only appears possible when a small force is mobilised, as, otherwise the necessary number of qualified officers is not available. In the event of a general mobilisation, the supply of officers extra to the establishment, who would return from furlough would not be more than sufficient to supply the vacancies in regimental ranks caused by the demand for Staff and Transport. The fact that such fresh troop leaders would not be present with their corps, at the outbreak of war, would delay the concentration. In any case, the scheme does not commend itself, as the English troop leader is quite as necessary in peace as during war, as the fighting efficiency of the Troop depends upon the thoroughness of the peace training.

Employing native gentlemen as troop officers.

(*b*). This appears quite unfeasible. The native gentleman is rarely to be met with. He suffers from the same characteristic defects as the native officer, adding as a rule fondness for the palanquin and zenana. He would have no stomach for the mastery, or practice, of the difficult detail required from a troop leader of the present day. Were native gentlemen qualified to be cavalry officers under modern conditions there would probably be no British supremacy in India.

Necessity of considering the qualifications of native officers.

It has been necessary to dwell at length on the inadvisability of entrusting the command of troops to native officers as, in spite of the general admission of their unfitness for such a charge, it is still placed in their hands. There are indeed strong reasons, based both on expediency and sentiment, for its being so. It is justly urged that the abolition of the rank would strike a severe blow at the popularity of the service. Sentiment further argues that our service ought in fairness to offer a field to the Indian soldier's ambition, and that such appointments are not more than a fair reward for long, and meritorious, service, besides which the native officer has so far proved himself perfectly capable of the services required from him. In reply to these arguments it must be said that as fighting efficiency is our first object, we must select the best available officers. No one will urge that the native is as good as the English officer. If we yield to sentiment, and employ inferior troop officers, we shall probably expiate the mistake in disaster. The abolition of native officers is not suggested, it is recommended that they should not be given so important a command as that of a troop. The principal duty of the English officer, with reference to the native soldier, is to train him to be an efficient fighting machine. There are many relations between the native soldier, and his superiors, which do not directly bear on the fighting efficiency of the former, in which the presence of the native officer is of the utmost importance. He appears a necessary portion of the system, as the more exacting we are with reference to the standard of military training, and we must be more exacting to attain the necessary efficiency, the less should the other details of the service be allowed to press on the men. It would be the function of the native officers to have these measures, so important for the welfare, and comfort, of the soldiers during peace, carried out in the manner which, their own feelings will tell them, will cause their men the least inconvenience. In this respect the English officer as a foreigner would naturally be astray. It will no doubt be objected that it is extremely costly to maintain native officers principally for purposes of interior economy, and to encourage recruiting. It may be replied that it appears a natural drawback, consequent on the fact that the English officers, and the men, are drawn from different nations, representing

Native officers indispensable.

almost the opposite poles of civilisation. The harmonious working of a Regiment is a necessary preliminary to its efficiency. It is further to be observed that considering that it provides its own horses, equipment, and transport, the Indian Cavalry, even after the additions about to be proposed have been made, will compare favourably as regards cost with that of any army in the world.

(e). The Cavalry is too light.

(e). Prince Hohenlohe says that a state will maintain as heavy a Cavalry as possible. As India does not maintain an exceptionally large cavalry force and better horses are available than those in use in the Indian Cavalry she does not fulfil the Prince's condition. It is true that the Cossack portion of the Russian Cavalry have light horses, but since their reorganisation in 1875, the Cossack horses have been much improved. As the Indian Cavalry are trained to act according to the shock tactics of the day, more weight is required. The adoption of a loose attacking formation, such as the 'lava' of the Cossacks, does not appear advisable, as it would be contrary to the general principles of our drill and training, and would not be likely to succeed against compact bodies of well trained and well handled cavalry. This defect in our material can be easily remedied by a grant in aid to regimental Chunda funds, as it is not to be expected that the amount brought in by recruits can be increased.

Minor disadvantages resulting from the irregular system and the absence of a higher organisation.

In addition to the principal disadvantages set forth above, the Indian Cavalry suffers from the following minor drawbacks which are to be attributed to the irregular system, and the absence of a higher organisation.

(a). There is no school for the instruction of officers in reconnaissance.

(b). There is no systematic gymnastic training for drilled soldiers.

(c). There are no Riding-Masters in Native Regiments.

(d). There is no Riding Establishment for training instructors in riding.

(e). There is no school of arms for the training of instruction in the use of the sword and lance.

(f). The musketry training is carried out on the same principles as that of Infantry. Owing to the presence of a special staff for superintending the training, and the numerous returns, both of practice, and drill, required, musketry is practised at the expense of more useful exercises.

(g). The training in the use of the sword and lance, forms the subject of no special returns; it is therefore casual, and in some cases, almost neglected. The regulation lance and sword exercises which should be the minimum, are usually the maximum training, given to any but the smartest men.

To consider these disadvantages in detail.

(a). There is no school for the instruction of Cavalry Officers in reconnaissance.

(a). This part of the Cavalry Officer's education has hardly received sufficient attention. A cadet at Sandhurst learns little more than the necessary preliminary knowledge of surveying required for reconnaissance. The importance of training officers for this duty cannot be over-estimated. Though part of the strategic reconnaissance will be carried out by Staff Officers of the Intelligence Department, a great part of the duty must fall on the Cavalry. The practice in reconnaissance carried out at stations cannot be regarded as being as satisfactory as systematic instruction. A Cavalry Regiment would not be inconvenienced by the absence of some of its officers at a course of instruction in reconnaissance during the hot weather. The course recommended would be as far as possible practical, in fact strictly what would be required on service. Cavalry Officers should not be required to draw carefully detailed maps. In any regular war it is to be presumed that our Intelligence Department would be provided with general maps of the theatre of operations from which enlarged skeleton maps would be prepared for the use of officers detailed to execute reconnaissances. Every cavalry officer should be prepared to fill in the necessary details on such a map with reasonable accuracy and rapidity, accompanying the map when necessary by a clear, concise report. Lucidity, and rapidity are the chief objects. The necessary radipity can only be attained by constant practice, and the elimination of all unnecessary preliminary work. Reconnaissance is too often lost sight of in the surveying necessary, it is really rather the work of the soldier than the surveyor. Unless a high standard of efficiency in reconnaissance is attained by our officers there will be comparatively little use in defeating an adversary's Cavalry as we shall not be able to reap the fruits of our success. It is to be hoped that a few years hence qualification in reconnaissance may be made as necessary for officers of Cavalry, as that in musketry is becoming for those in the Infantry.

(*b*). No systematic gymnastic training for drilled soldiers.

(*b*). It appears especially desirable that the gymnastic training of the Indian Cavalry soldiers should not terminate with their instruction as recruits, as the majority of the men do not lead an athletic life. Only a small percentage of the men join the English officers at polo, and appear to compete at military tournaments.

(*c*).—No riding-masters in native regiments.

(*c*).—The absence of riding-masters renders it impossible for the regular system of drill to be properly applied to native regiments. The effective action of Cavalry, in the shock tactics of the present day, depends so much on the compactness, and order, of the charging body, that the instruction of the men in riding and the training of the horses is the foundation of cavalry efficiency However skilled cavalry may be in the use of their weapons, if they charge in disorder, or without cohesion, a better trained body will disperse them. However well the men may ride naturally it is impossible for Cavalry soldiers to manœuvre properly and charge compactly unless they have been thoroughly taught to ride, in the riding school, on trained horses. There appears to be no reason in connection with the especial material of which it is composed, to exempt the Indian Cavalry from the necessity for careful instruction in equitation. The officers, in the English Cavalry are drawn from a class to which belong the finest horsemen in the world, but this has never prevented their being carefully instructed in military riding.

(*d*).—Necessity for a Riding-establishment.

(*d*).—The introduction of a riding establishment to provide properly qualified Riding Masters and Instructors appears a necessary feature in the reorganisation of our Cavalry.

(*e*).—There are no schools of arms for instruction in the use of sword and lance.

(*e*).—This appears as necessary for Cavalry as Schools of Musketry are for Infantry.

(*f*).—Cavalry should not be placed under the same conditions as Infantry for musketry drill and practice.

(*f*).—The secondary importance of the fire action of Cavalry in modern war has already been pointed out. The disadvantage of subjecting the musketry training of the Cavalry, to the same control as the Infantry, is most apparent in the manner in which field firing is practised. Allowing for differences in the practice in various stations Cavalry are usually supposed to engage in an offensive action against troops in position. As the first requisite for so important an exercise, as that with real ammunition, is that the movement practised should be what might be expected in actual war, the practice in such a rôle is rather injurious, than othervise, to the cavalry arm. Under no circumstances could dismounted Cavalry succeed in an attack on Infantry in position, as it is not only beyond the tactical powers of the arm, but contrary to its most effective use: it should therefore never be practised in such a rôle. The training required for the purpose, and the confidence in the carbine that it would instil in the soldier, could not but be prejudicial to the true cavalry spirit, and constitutes a real danger to the efficiency of the arm.

(*g*).—There are no returns submitted of the practice with sword and lance.

(*g*).—It will be be suggested that the training of Cavalry in the use of the lance, sword, and carbine, should be placed under the control of special officers which will place the practice on a proper footing. The submission of returns of practices may be said to be no guarantee of efficiency, however in a service like ours the portions of the training which form the subject of returns are more practised than those which do not; it seems advisable therefore, to bring the more important parts of the training into prominence in this manner.

Necessary condition for successful reorganisation.

A new organisation to be successful must obviate these defects.

Advantages of the Indian service.

The following advantages if turned to account should more than counterbalance the defects from which our Cavalry suffers.

(*a*).—The good class of the men.

(*a*).—The relatively good class from which the men are drawn.

(*b*).—The Indian is a long service army.

(*b*).—The fact that the Indian is a long service army and that the full establishment of horses is maintained during peace.

(*c*).—There is an abundant supply of British officers procurable.

(*c*).—That it is possible to obtain a supply of excellent English officers.

(b).—The Indian army is long service and the full effective of horses are maintained during peace.

(b).—The training of the Indian Cavalry can be carried to a higher pitch than that of the continental nations, who have been obliged to turn their squadrons into training schools for the greater part of the year. In the Indian service no hurry need interfere with the thorough training of the recruits, while the drilled soldiers should, with a proper organisation, improve every year. There is the further advantage of superior cohesion, and of uniformity in training, which has been carried out up to the very commencement of the campaign, and is quite up to date.

(c).—This is the principal advantage possessed by the Indian service. In modern times the officers are the criterion of an army. The position which Germany occupies, as the first military power in Europe, is chiefly due to the recognised superiority of her corps of officers. This is an advantage which can be turned to account at once. Most of the safeguards against invasion that have been suggested in England depend upon the occurrence of the emergency. Every student of modern military history will recognise the necessity for preventive measures that anticipate the event.

The shortcomings of our cavalry attributable to defective organisation.

It is fortunate that the short comings of our service are attributable to defective organisation, rather than to any want of military spirit among the men, or energy among the officers. The devotion and zeal, of all ranks in the Indian Cavalry are not excelled in any army in the world. The necessary changes must be made by the supreme authorities as it has been shown that no efforts can bring our service up to the required standard without a complete and radical change in its organisation. The end to be attained must be kept clearly in view. The highest possible fighting efficiency must be aimed at. It is impossible to lay down too high a standard as it is only by striving for the very best that satisfactory results can be obtained. However far short we may fall of perfection, in striving for it, we may outstrip our adversaries. The organization required is one, that to use Von Schmidt's words, will favour the highest development of fighting power for our men, and marching, and charging power, for our horses, and the most thorough individual training of officers, and men, in reconnaissance. To attain this a unit must be adopted sufficiently small to admit of the devotion of considerable attention to each individual man and horse, and it must be placed in the charge of thoroughly competent officers. In a word, the required organisation must be based on decentralisation, and the distribution of authority, and responsibility. But the combined action of Cavalry is as important as ever, therefore the command arrangements must be determined, and the higher commanders carefully trained, during peace.

Proposed organisation of the Cavalry of the army in India.

It is to further the fulfilment of these ends that the following organisation is recommended for the Cavalry of the army in India.

The Inspector-general of Cavalry in India, (ranking as a Major-General.)

Assistant Adjutant-General for Cavalry.

Aide-de-camp to the Inspector-General.

Four Cavalry inspections each under a Brigadier-General Inspector.

India to be divided into four cavalry inspections, each under an Inspector of Cavalry, ranking as a Brigadier-General. Each Inspector to have a Brigade Major. Assuming the distribution of the army to be as at present, the following inspections are proposed.

1*st*—Inspection.

1*st.*—To comprise the Punjaub, with the exception of the Umballa district.

2 Regiments of English, and 15 of Indian Cavalry.*

2*nd.*—Inspection.

2*nd.*—Comprising the Umballa district of the Punjaub, and the remainder of the Military Presidency of Bengal, except the Quetta district.

3 Regiments of English, and 9 of Native Cavalry.

3*rd.*—Inspection.

3*rd*—Comprising the Military Presidency of Madras, and the Hyderabad Contingent.

2 Regiments of English, and 8† of Indian Cavalry.

4*th.*—Inspection.

4*th.*—Comprising the Military Presidency of Bombay, the Central India horse, and the Quetta district.

One regiment of English, and 10 of Indian Cavalry.

Inspection Head-Quarters.

The Head-Quarters of the inspections would be.

1.—Lahore.
2.—Lucknow.
3.—Secunderabad.
4.—Mhow.

Provision of transport at H. Q. Stations.

The transport necessary for a complete cavalry Division would be maintained at each of these stations during peace.

Cavalry regiments to remain subject to the district authorities as at present.

The cavalry regiments would remain subject to the generals commanding districts as at present and submit all routine returns, applications, &c., to the district staff, with the exception of Musketry returns. Reports of the exercises with lance, sword, carbine, would be submitted to the Brigade-Majors of inspections, as well as such special questions as affect the cavalry arm exclusively.

There appears to be no reason for apprehending friction between the Inspectors and the Generals commanding districts. The appointment of Colonels on the staff, subordinate to the Inspectors, to take the place of Brigade Commanders, has not been recommended, as it would have the effect of making Cavalry a special service. It is considered that the Inspectors could select Brigadiers, and have them trained at manœuvres, which form an essential part of the proposed preparation of the cavalry for war. The removal of the Brigadiers from their regiments on proceeding on service would occasion less inconvenience in our service, than in any other, as there are always a number of senior officers on furlough who would be available for employment in case of war.

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* The Cavalry of the Corps of Guides, and the eight Indian Regiments in the 3rd Inspection, to be raised to four squadrons each.

† It is assumed that the Madras Cavalry regiment at Kamptee will be restored to the Madras command.

Yearly camps of exercise.

It appears probable that the scale of pay of the native ranks in the Indian Cavalry will shortly be revised; a good opportunity therefore presents itself for rendering their pay consolidated *i. e.*, abolishing marching batta which would render cavalry camps of exercise comparatively inexpensive. It is proposed that a Division should be formed for manœuvres in two of the cavalry inspections each year to act against one another. The manœuvres would take place under the direction of the Inspector-General, each Inspector would command the Division formed from the Cavalry of his inspection. There would always remain sufficient cavalry in the inspection rayon to furnish divisional Cavalry to accompany any force of the other arms detailed to take part in the manœuvres. In this manner four cavalry Divisions would undergo a course of training, under service conditions, once in two years, and be provided with trained Brigadiers, although they would not form part of the permanent organisation. The systematic practice of peace manœuvres is of the utmost importance in India as our experience in local wars is of little value as a preparation for a campaign against an European enemy, under modern conditions. This is especially true with reference to Cavalry, as large bodies of that arm have not been called upon to act together in any of our recent wars.

Higher organisation necessary whatever the distribution of the army may be.

The above organisation for the higher units of the cavalry in India has been adapted to the existing dislocation of the army. It is only intended to illustrate the lines upon which the proposed organisation would work; no doubt as time goes on and the danger of invasion becomes clearly more pressing than that of revolt, the Indian garrison will be concentrated closer to the menaced frontier and full advantage will be taken of the railways (the important points of which will be temporarily fortified) for maintaining order within the Empire. But wherever the Cavalry may be quartered the essential features of the proposed organisation are absolutely necessary to qualify it to play its part in the defence of India.

Organisation for service.

In the event of a general mobilisation being ordered, a Division of of two Brigades, each of three regiments, and a detached Brigade of three regiments, would be formed in each inspection. There would remain in the 1st inspection eight, in the 2nd third, in the 3rd one, and in the 4th two, in all 14 regiments of Indian Cavalry, besides depot squadrons, to supply divisional Cavalry, re-enforce the field troops, and together with the Brigades not required for active service, form the cavalry portion of the garrison of India. It is beyond the scope of this essay to consider whether the available force of Cavalry is above or below our requirements. It is however pertinent to the subject to remark that as the limit to the number of Cavalry employed will be fixed by the conditions of supply, efficiency seems more desirable than numerical strength. If the increased costliness of the proposed reorganisation were to prove a bar to its adoption for the whole of the Indian Cavalry, it would be recommended to disband a certain portion, and raise the remainder to the required standard of efficiency, as in the war to be waged quality, rather than quantity, appears the desideratum. The superior fighting value of Cavalry reorganised on the proposed system would quite compensate for any reduction in its numerical force.

Advantage of freeing the Inspector-General from the present detailed inspections.

The appointment of Inspectors would enable the Inspector-General to devote himself to the direction of the training of the arm; he would also have time to institute, and superintend the schools for reconnaissance, the use of arms, and riding, which are indispensable for the progress of our Cavalry towards the European standard of efficiency.

Peace organisation of the squadrons.

The squadrons would consist of:—

The Squadron Commander.
2 Squadron officers. Troop Leaders.
4 Native officers in charge of half troops.
1 Squadron Kote Duffadar.
1 Squadron Quarter Master Duffadar.
10 Duffadars.
13 Lance-Duffadars.
138 Sowars.
2 Trumpeters.
2 Farriers.
2 Camel sowars.
Total of all ranks 176.

Regimental establishment.

A regiment would consist of four such squadrons with a regimental establishment of:—

1 Commandant.
1 Adjutant.
1 Assistant-Adjutant (Riding Master) and Quarter-Master.
2 Subaltern officers (probationers) in charge of half troops.
1 Woordie-Major.
6 Duffadars (drill, riding, gymnastics and fencing, farrier-major, store and salootrie.)
3 Lance Duffadars (drill, riding, and gymnastics and fencing).
1 Assistant salootrie.

As the establishment of English officers is the minimum necessary to ensure the required standard of efficiency it would be constantly maintained by appointing officers to officiate for those absent on furlough as at present.

During peace the senior native officer would be relieved from the charge of a half troop, and another native officer could be detailed to assist, either in superintending the exercises in arms, or the training of

Native cavalry regiments should train their own officers.

the remounts, thus half troops would be available for two young English officers. There seems to be no reason why native regiments, when proper riding and fencing establishments have been introduced, should not train their own officers. This would obviate the existing inconvenience of denuding English regiments to supply the Indian service, and would be particularly applicable were the proposod reorganisation carried out, as the demand for extra officers could only be met by drawing a supply direct from England. The adoption of such a measure would benefit alike the officers, and the regiments, as it would be better for the young officers to join cavalry at once, instead of as present, in the majority of instances, serving first in British infantry regiments, while the latter would be benefitted by the fact that their officers would be thoroughly identified with them. Should a regiment proceed on service a vacancy for a troop leader would occur as an officer would be detailed for the depôt. Thus there would be a supernumerary British officer present with each regiment proceeding on service.*

The squadron is as nearly as possible the same strength for peace training as for service.

The squadron has been so organised that its strength for peace trainining would be approximately the same as that for service.

Service strength of a squadron.

The service strength of a squadron would be :—

3 English officers.
4 Native officers.
Squadron Kote Duffadar.
Squadron Quarter-Master Duffadar.
8 Duffadars.
8 Lance-Duffadars.
124 Sowars.
2 Trumpeters, two farriers, and two camel sowars.

Depôt establishment.

Thus each regiment besides the non-commissioned officers of the drill and riding establishments would have a depôt consisting of.

8 duffadars.
8 Lance-Duffadars.
88 Sowars.

A native cavalry regiment would therefore proceed on service in the highest state of efficiency, both as regards men, and horses. During peace the extra establishment of Duffadars, and Lance Duffadars, would enable the places of the squad non-commissioned officers employed on orderly duty to be taken by junior non-commissioned officers.

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*The question presents itself whether the Asst.-Adjutant should accompany the regiment on service as Quarter-Master or form part of the depôt establishment. As the proposed organisation is directed rather to the attainment of efficiency for immediate service, than the formation of second line troops, the Riding-Master accompanies the regiment. It would however make no essential difference in the proposed organisation. should he be attached to the depôt, in which case, the Quarter-Mastership would be held during peace by a troop leader, who would be replaced by the supernumerary subaltern, when the regiment proceeded on service.

The squadron the unit.

The squadron would be in every respect the unit. Troops would no longer be numbered consecutively in the Regiment they would be merely the right or left troop in the squadron. All promotions up to the grade of Kote-Duffadar would be made in the squadron. Squadron orders would be issued daily, the squadron being at the disposal of its commander when not required by the commandant. The training of the recruits, and remounts, would be carried out regimentally, in order to enable the attention of the officers to be concentrated on the drilled soldiers, to raise them to the highest possible efficiency.

The troop and not the division recommended as a manœuvring unit.

A troop of 35 files has been proposed as the manœuvring unit. It is not recommended that the squadron should be divided into pelotons, or divisions, as however applicable such a formation for manœuvring may be to armies with a large supply of qualified officers, it does not appear the right one for ours in which it seems an indispensable condition that the men should always be subject to direct European leadership. The proposed troop does not form an excessively large manœuvring unit and the slight loss in mobility would be more than compensated for by the gain in efficiency of command. It may further be remarked that unless they are exercised on very unfavourable ground the larger the unit in which Cavalry are manœuvred the better it will be prepared for movements in line which is the fighting formation of the arm.

The proposed organisation based on the practical view; the logical sequence of the shifting of the responsibility for the squadron to the squadron commanders.

The proposed organisation has been based on the practical, rather than the theoretical, view of the question. The fighting efficiency aimed at is to be attained by the least possible change in the constitution, and traditions of the Regiments. The proposed alterations appear perfectly feasible, and may be regarded as the logical sequence of the recent reforms in the training of the Indian cavalry. The introduction of squadron training, and the shifting of the responsibility for the efficiency of the squadron, from the Commandant, to the Squadron Commander, shook the present system to its foundations; the adoption of the proposed organisation would merely give it the coup de-grace.

The duties of the officers under the proposed system.

An examination of the duties of the officers under the proposed system will show how thoroughly its adoption would eliminate the undue direct influence of the Commandant and Adjutant on the Regiment.

The Commandant.

The Commandant would supervise the training of the squadrons, and satisfy himself that it was thoroughly carried out. He would train the Regiment to act as a whole. He would carry out periodical inspections of the squadrons paying especial attention to the individual efficiency of the most unpromising looking men, in the use of their arms, and horsemanship. He would devote particular attention to the training of young officers, and recruits, and direct the practice of the officers in reconnaissance. He would be responsible for maintaining the discipline of the Regiment, and for arranging for the purchase, and training of remounts. In addition to these duties he would use every effort to qualify himself for the position of leader of a line.

The Squadron Commander.

The Squadron Commander would be responsible for the training, and efficiency, of the men, and horses, in his squadron. He would identify himself with the squadron, which should be accustomed to obey his every order, and signal. He would allow as much latitude, as was consistent with his command, to troop leaders, and work through them making them feel their responsibility. He would be acquainted with all the men, and horses, under his command. He would encourage the men in the practice of gymnastics, and the use of their arms, and pay particular attention to the condition of the horses. He would maintain good relations with the native officers, and consult them, on all questions relating to the interior economy of the squadron, and the comfort of the men.

The Troop Leader.

The troop leader should have an intimate acquaintance with the men and horses under his command. He would devote especial care to the training of backward men. He would accustom himself to command, study and practice reconnaissance, and encourage his men both by presence, and example, to gymnastic exercises, and practice in arms, in addition to those which would form part of the systematic annual instruction.

The Native Officer.

Native officers would be entrusted with the charge of pelotons, or divisions, with the exception of a peloton in the troops of the two senior troop leaders to which the two subalterns on probation would be posted to enable them to learn their work from the very beginning.

The Duffadar.

Duffadars in charge of sections complete the chain of responsibility.

The Adjutant would be the Commandant's Staff Officer. He would be responsible, with the assistance of the Assistant-Adjutant, for the instruction of the recruits, and the training of the young horses. He would prepare the Regimental returns of the exercises in arms of the corps, would devote especial attention to the training of young English officers, and, under the superintendence of the Brigade-Major, and Commandant, direct the reconnaissance practice of the junior officers. He would also attend to the instruction in their duties of young non-commissioned officers. If it be taken into consideration that a recruits' training includes, besides riding, and drill, a regular gymnastic training, careful instruction in the use of the sword, and lance, the preliminaries of reconnoitring, and musketry, it will be apparent that the various duties set forth above present a fair field for the activity of any subaltern officer. It is only those who have not tried it who can believe that an officer can, in addition to performing the legitimate duties of an Adjutant, thoroughly succeed in (to use the military parlance) 'running' the Regiment as well.

Auxiliary arms of Cavalry.

In considering the re-organisation of our Cavalry, the addition of auxiliary arms to it has not been discussed. It is of course assumed that whatever cavalry is detailed for field service will be accompanied by the usual proportion of Horse Artillery. The other auxiliary arms which have either acted in conjunction with Cavalry in the field, or been recommended for the purpose, are Mounted Pioneers, Mounted Infantry, and machine guns.

Mounted Pioneers.

Mounted Pioneers were used with great success in General Gourko's great strategic reconnaissance beyond the Balkans in 1877. They appear an indispensable adjunct to cavalry in its strategic uses, as, besides executing the necessary engineering work for the force they accompany, they could furnish the officer commanding the engineers of the main body, an estimate of the work that would be required from his corps. Native soldiers have shown themselves so admirably adapted for pioneer work that a squadron of Horse Pioneers organised in four sections with an establishment of 5 British officers, 8 British non-commissioned officers and some 200 rank and file to each Inspection would be a valuable addition to the war effective of the Indian Cavalry. This appears in every way more desirable than the maintenance of a quota of pioneers in each Regiment. Such troops to be useful must be specially trained and placed under Engineer Officers. A further argument in favour of the establishment of Pioneer Squadrons is that a proportion of the ranks of the cavalry could be instructed in demolitions, though considering the conditions of the probable theatre of operations such knowledge is of less importance here than in Europe.

Mounted Infantry.

Mounted Infantry and machine guns have not been employed as an auxiliary to Cavalry on service. The advisability of employing mounted infantry has been already discussed. It is sufficient to add that owing to the scarcity of supplies in the probable theatre of war we could only use the hybrid arm to the exclusion of Cavalry.

Machine guns.

Machine guns are different. They represent Infantry fire in a highly concentrated form. Their mobility, accompanied as it is, (when compared with Mounted Infantry) by a trifling demand for transport, and supplies, render them a valuable auxiliary to Cavalry, though the shortness of their effective range seems to adapt them to further the secondary or defensive uses of the cavalry arm rather than the primary or offensive. Machine guns have been attached to cavalry regiments in England. It does not however appear advisable that auxiliary arms, attached to Cavalry, possessed of a different tactical action, should form part of it, nor does it seem that Cavalry whose action as an independent arm does not depend on fire-effect, should be called on to supply the personnel for Machine gun batteries. Judging from the efficiency of the auxiliary arm furnished by the Royal Artillery to our Cavalry, it is reasonable to expect that were that corps called on to furnish Machine gun batteries as a support to Cavalry the duty would be efficiently performed.

Savage warfare requires no special peace preparation or change in organisation.

The uses of Cavalry in savage warfare require no special preparation in peace as the proposed standard of efficiency is far higher than that necessary for such campaigns.

Conclusion.

The great increased development of the European railway systems during recent years has tended to create a difference between European and Asiatic wars. The rules of strategy and tactics depend in a great measure on the numerical strength of the opposing forces. There is no present probability of such a development of communications in Asia as would enable large forces to be employed in a campaign which would affect the integrity of our Eastern dominions. This constitutes the great advantage of England's position as it removes the necessity for conscription which presses so heavily on all the European powers. But as the efficient Military defence of a country can only be ensured by rendering its forces too formidable to be attacked, the Indian army must be raised to the highest efficiency, a result that is perfectly attainable with the excellent available material and the resources of the greatest Empire the world has ever seen. When this efficiency of our forces has been attained we may rest assured that the British Empire in India will be as stable as any institution in this changing world and that our subjects will continue to enjoy the now famous 'pax Britannica.'

SECOND ESSAY.

By Captain A. Masters,

C. I. Horse.

"The worth of the Jewel is in the quality of its Gems."

Introduction.

"The organisation and employment in war of Native Cavalry" is a subject of public interest at the present day, when our N.-W. Frontier defences are being placed in good order, and the quality and numbers of troops available for employment there are under consideration. The limited space allowed for the treatment of the subject renders it advisable to confine the discussion to the salient features of the numerous matters which form important branches of the subject.

Origin of Native Cavalry.—In days gone by, when the English had acquired only a partial footing in India, and were continually being drawn into petty campaigns against the neighbouring Chiefs, the system originated of raising Irregular Cavalry in the country. Troops were raised through Natives of influence on certain terms; the contracting parties would get together, mostly under the *Bargeer* system, a number of followers, chiefly relations, friends, and menials, fit them out with arms, accoutrements, and horses, and thus make up troops and squadrons under their own personal command; and the British representatives would pay so much per month for each effective Sowar thus provided and maintained.

There was practically little or no preliminary drilling necessary. The country was in a constant state of turmoil, and conflicts amongst the innumerable Chiefs of greater or lesser note, were almost of daily occurrence in all parts of India; hence the fighting classes acquired the art of wielding the sword and lance with skill, and they were kept in constant practice. No knowledge of complicated drill and manœuvring was required, but the men followed their leaders under a simple primitive system.

I am not in a position to consult any of the books which give full information on these matters, and therefore cannot go into further details, which, moreover, are not necessary. Suffice it to say, the organisation, arms, equipment, saddlery, &c., were all of the country, and they answered their purpose excellently.

Introduction of Improvements.—As time rolled on improvements and alterations were made, new ideas introduced, and matters were worked on a more methodical basis; and *Silladars*, or men who were engaged fully equipped and horsed at their own expense, were employed in increasing numbers. Since the days of the Mutiny of 1858, however, the greatest changes have been effected in the Indian Cavalry, it has been Europeanised immensely. Indian arms and accoutrements have been discarded, the *charjama* replaced by the universal pattern saddle, and the drill and instruction carried out on precisely the same lines as in the British Cavalry.

Swordsmanship and its decline.—Vast improvements have been effected in drill, discipline, training, arms, and equipment, but in the wake of these developments there have followed some evils. Formerly every man that took service was a professional warrior and efficient in swordsmanship, an accomplishment he acquired of necessity while living in those disturbed periods of Indian history when the Maharattas, Pindarees, and such like marauding peoples committed their depredations. It was chiefly due to this training that India became famed for its swordsmen, a fame that has not been surpassed by any other country in the world. The peculiarity of the Indian swordsman of renown was his preference for a curved sword having a razor-like edge, with which he delivered deadly blows by a chopping sort of cut; he had no notion of giving a point with a straight sword.

The Sowar of the present day, taken from the plough in a country where peace continues to smile uninterrupted, lacks that proficiency which made him a formidable antagonist in days gone by. His regimental training, it is to be feared, devotes more attention to the cleaning and fitting of his sword, than to the handling of it in combat, as if this were a virtue which having once existed could never be lost again in succeeding generations. This falling off in swordsmanship is the most serious weakness that has crept over the Native Cavalry, and it is not creditable to their Officers. We all know that the Native soldier enters with enthusiasm into all sports and pastimes that his Officer takes an interest in: instance those regiments that excel in shooting, or tent-pegging, or polo, &c., where the Officers set the example and the men follow the lead in proportion to the ardour shown by the Officers. Now it is notorious that very few Officers in the Service show a keen interest in swordsmanship and mounted combats by perfecting themselves in this branch of a Soldier's training. This defect could be soon remedied if Officers Commanding Regiments would set their minds to do so. The Indian Sowar is by nature a horseman, he learns to ride quickly, gets croppers without being injured, and is passionately fond of mounted sports, tent-pegging, and feats of horsemanship; and he only requires to have some Loose Practice every week, conducted systematically, with leather-covered and wadded single-sticks of same weight and length as his sword, and in a short time marked improvement will be observed in the skill of the man as well as the handiness of his horse. This assertion is based on practical experience.

The Native Cavalry of the present day and its Institutions.—The change from the *Bargeer* to the *Silladar* system was a vast improvement, whereby the Sowars of former days, frequently the destitute and menials of the Native Officers, are not replaced by the Sowars of the present day, mostly recruited from the independent and well-to-do gentry of the country, holding shares in their villages, and with a vested interest in their Regiments in the shape of the value of their *assamies* *; which also serve to a certain extent as security for their good behaviour and loyalty.

There is a great deal to laud that is excellent in the Native Cavalry and its organisation, but amongst the different Regiments there are various degrees of excellence; no two Regiments are precisely alike, some are good on parade and indifferent in interior economy, others just the opposite, and so on to the minutest sub-divisions of variety. In the following observations, therefore, wherever room for improvement is implied, it signifies that such matter exists to a noticeable degree in some Regiments.

The Native Cavalry of the present day are a well-drilled, properly mounted, and excellently equipped body; and it speaks very highly of the system on which all this is accomplished at so small a cost to Government. Commanded by energetic Officers, these regiments have made great strides towards a higher standard of efficiency during the last quarter of a century. For 27 rupees a month a Sowar is maintained fully equipped with horse, arms, accoutrements, and all the requisites for campaigning, Government providing the carbine and ammunition only.

The Regimental Chunda Fund, to which each man contributes 2 rupees a month, is an insurance so to speak for his being mounted up, whereby his horse, when destroyed or not fit for duty, is replaced by a new animal. All accoutrements are likewise provided under regimental arrangements. Promising recruits, who have not the amount of money requisite to pay for an *assami* in full, are assisted by the Regiment with a loan which is repaid by monthly instalments. In fact the Regiment does everything for itself, without assistance from Government. These various Funds and Regimental institutions are managed under the responsibility of the Commanding Officer, either by himself or by Officers appointed by him; and valuable assistance is rendered by the Committee of three senior Native Officers, who give their opinion or decision on such questions as are referred to them for settlement. This Standing Committee of Native Officers should also inspect the Regimental Accounts periodically, so that the expenditure of all moneys may be known to them; this acts as a safeguard against money being misappropriated by the accountants.

The Regimental Durbar is a healthy institution, and the marked difference between the conducting of Orderly Room in a British Regiment and the procedure at Durbar in a Native Regiment indicates the difference there is in our general treatment of British Soldiers and Native Sowars, and the methods of settling their affairs. In place of the straight-laced Orderly Room, with its stand to attention, Queen's Regulations, and red-tape, we have the Durbar for Native troops, where every Soldier who chooses is at liberty to attend; where instructions on various matters concerning the Regiment are given, petitions heard and considered; and questions connected with the welfare of the Regiment are discussed freely. All this is in keeping with Oriental ideas on the fitness of things. In a British Regiment the officer is more of the strict disciplinarian over an unruly crew of independent spirits; in a Native Regiment he is the patriarch of the flock and guiding spirit that leads them aright.

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* The *assami* is the value paid by a Sowar to the Regiment for his horse, arms, accoutrements, deposit fund, &c., &c. A Sowar that pays for all this is a *Sillodar*. But the Sowar is a *Bargeer*, and draws his dismounted pay only if a third person pays for his horse and trappings, and draws the allowance for these.

The Sowar is practically a volunteer all through his service, that is to say, he need not serve if he does not choose to do so; he has the right to claim his discharge on giving two months notice, provided his troop is not ten below strength, and the country is not at war. Therefore in our dealings with them we should not make the Service hateful or distasteful, or else the men we wish to retain will leave, and only those will remain who cannot afford to go, or who come from an inferior class and are not worth having in the ranks.

The Native is by nature very amenable to discipline and the British Service is not necessary for him. But as may be expected where there are so many different tribes and races that furnish Sowars, there are bound to be differences in the degree in which these remarks apply to them. Cases of breach of discipline will naturally occur from time to time and be settled by admonition or the various degrees of punishment the Commanding Officer has power to award; whilst habitual offenders and bad characters can readily be got rid of under the ample powers conferred on Commanding Officers by the Indian Articles of War in the trial by Summary Court-Martial.

THE ORGANISATION OF NATIVE CAVALRY.

The *alpha* and *omega* of every detail in the organisation of Native Cavalry should be to enhance the efficiency of the force for employment in war; this is the primary object to be kept steadily in view.

We now have an Inspector-General of Cavalry, and this should produce good results. Formerly each Regiment was able to introduce its own fad with impunity, as the Inspecting General usually knew very little about Cavalry, and Regiments could do pretty well as they pleased. Such a state of things should now be impossible. All Regiments should be trained and turned out on the one model which is deemed the best by the Military authorities.

The present establishment of a Regiment is fixed at 10 British Officers, 17 Native Officers, and 608 Rank and File, and they form 4 Squadrons or 8 Troops. The Squadron is the tactical unit, and is under a Squadron Commander who should be responsible for its efficiency. This organisation is found to work very well in peace time; but on active service a considerable increase to the number of British Officers would be imperative.

Sowars and matters concerning their interests.—The enlistment of recruits of a good stamp from the proper classes is one of the most important matters in the organisation of Native Cavalry. The men of the Bengal Cavalry are, as a rule, good; they mostly come from martial races, and are of good family, respectability, and have property at their homes; and the principle is good of keeping them in Class Troops where they can preserve their customs and traditions, instead of being mixed together as in the other Presidencies.

The best fighting material undoubtedly comes from the Punjab and northern parts of Hindustan; whilst to the South the races are degenerate and show few martial traces. A previous history of rough times seems to explain the reason for the northern frontier races having developed into a hardy people with warlike instincts, or this may be due in part to a more rigorous climate and greater difficulty in earning a livelihood. I would classify the principal races in the Indian Cavalry in the following order for excellence :—

Jut Sikhs, and others of the same religion.
Frontier Pathans, Mooltanies, and Baloochies.
Punjabi Mussalmans, Teewannas, &c.
Dogras.
Ranguts from Rhotuck.
Mynpoori Chowhans.
Rajpoots from Rajpootana.
Jats, and a few other races of less note.

Some excellent men are obtained from the Maharattas, Delhi Mussalmans, Brahmins, Poorbeas of sorts, and Dekkanis, but none of these races can be classed as a whole as furnishing good fighting material.

The Goorkhas from Nepaul probably take the first place for excellence as Soldiers in the Indian Army, but their reputation has been gained in the Infantry, and they hold no place in the Cavalry.

The question of the relative merits of Class Troops and Class Regiments has been discussed threadbare, and I do not propose to plunge into the controversy now; but it appears that Government have, for political reasons, decided in favour of Class Troops for the majority of the Regiments, and the Regulations lay down the proportions of the different classes each Regiment is to be composed of. There is a strong feeling in favour of Class Regiments, as there is more cohesion in these; they are clannish, and *esprit de corps* runs high. Some Regiments are required by Regulations to maintain troops recruited from races who have not the character of being very enthusiastic warriors at the present day, whatever they may have been in days gone by. It is questionable whether such troops are worth the cost of their maintenance to Government.

A cry has arisen in recent years of the difficulty in obtaining recruits of the proper stamp, but it is hard to gauge to what extent this is true, unless one has the means of investigating the question in several Regiments; some Regiments certainly have not yet felt this difficulty. It is said the attractions of the Service are not so great now as they were in former years, and that the better classes of men prefer to secure occupation at their own homes, than launch out in a Military career. The attractions of Military service for the better classes are, good pay, frequent leave to their homes, the *izzut* of Government Military service to men with martial traditions, and a pension on retirement; the drawbacks are, leaving their homes, increased expenses at the present day preventing them from remitting as much money to their families as formerly, and the objection to being treated harshly; this last is not a common occurrence, but there are exceptional cases when a hot-headed young Subaltern does give vent to his feelings on occasions of his martial ardour receiving a shock; and it is said that their fears on this head are the cause of the Rhattores of Rajpootana, the most celebrated horsemen in India in the beginning of the century, not entering the Government Military Service.

One frequently finds good men retiring from the Service, because their landed property is suffering by their absence. Their fellow-shareholders and opponents in the village set up claims on their lands, and contrive to get the matter put in Court, and so manipulate it that the case is postponed repeatedly when the defendant is present, and when the wretched soldier is with his regiment, and unable to put in an appearance in Court, the case comes on for hearing, and in consequence his interests suffer. Government are aware of the existence of this abuse, and have provided rules to guard against the evil, but all these protective measures are more or less a dead letter, as they can generally be evaded. A law prohibiting the hearing of such cases against military men, except during the leave season, seems a desideratum.

Some easy-going Officers consider that it is the extra work required of a Sowar now-a-days with musketry, drilling, and all the new fads, that has made the Service distasteful; but experience seems to point just the other way, and it is found the best men and keen soldiers are always anxious to be at Regimental Head-Quarters busy at something, while the men who loved to be told off for any duty or detachment where they would have an easy time of it, were generally the men who had lost nerve on horseback, were shirks, and of least value as soldiers.

When the Sowar's pay was first fixed at Rs. 27, this amount was able to provide all the regimental requirements of the Sowar, feed him well, and leave a handsome balance to remit to his home. Since those days, however, prices of everything have steadily gone up year by year; the remount which was valued then at Rs. 200 is now priced at over Rs. 300, and everything else has gone up in the same ratio; but the Sowar's pay alone remains unaltered, consequently there is now a struggle to make the means supply the accustomed wants, and as a natural consequence the Sowar is not so pleased with his military prospects, and recruits of the desired stamp are not so easy to get. Of course an increase to the pay of the Sowar would restore the relative value of the position to what it was former years; but the Government find financial difficulties in the way of settling the question in this manner.

Various means for compensating the Sowar have been resorted to with some measure of success. The very liberal Furlough and Leave Rules which have recently been granted, and the free railway warrants issued to furlough men in the Indian Army, proceeding to and returning from their homes, are highly appreciated.

Some Officers occasionally air their nostrums for relieving the strain after this fashion, that if Government will allow the Regiment to draw its full pay but only keep up 95 per cent. of its nominal strength, or have 5 per cent. of dismounted men and their horse allowance put into the Chunda, or allow 10 per cent. of the remounts to be yearlings, or continue to draw horse allowance for three months after a casualty, and so on, this would yield sufficient money to ease the pressure and also help the Chunda Fund in its struggle for existence. All these are but contrivances to disguise the method of drawing extra pay for the smaller number of effective men and horses retained, and they are one and all beside the question, which is to keep up in an efficient and contented state our present effective strength in men and horses of the approved quality, without increased expenditure of public money.

Until Government see their way to increasing the pay of the Sowar, it is the duty of Officers to guard their Sowars' purses most jealously, and not put them to any needless expenses. A few years ago there was a rule that Native Cavalry should find all their accoutrements in the Country, and not provide themselves with requisites from Home; and some regiments that ordered swords from England, had the mortification of being compelled to pay duty thereon in Bombay, notwithstanding that the Commanding Officers furnished certificates to show that the swords were imported for the armament of regiments in Her Majesty's service. It is not apparent whether this prohibition to obtain goods from the English market was intended to save the Sowar's pockets from the cost of unnecessarily expensive articles, or whether it was intended to compel regiments to use country-made goods for the encouragement of the Indian manufactures. Whatever the cause was, this restriction is now apparently withdrawn, and the Native Cavalry have been recommended to get their next supply of saddlery of the new approved pattern from Home. There is no doubt the English-made saddle is of far superior material and workmanship to what Cawnpore turns out, and it is very taking to the eye; but there is a surprising difference in the prices; the former costs three or four times as much as the latter. Consider the time it will take a Sowar to pay up the price for this English saddle! The Cawnpore saddle is very serviceable and good, and it lasts from eight to twelve years, depending on wear and tear, and the critical eye of the casting officer. Will the English saddle last three or four times as long? If so, then it would be cast for being of an obsolete pattern before the Sowar had time to get money's worth out of it. The same may be said of other expensive stores frequently procured from Home.

Wholesale changes of uniform and equipment are conducive to scaring away the better classes, and lead in the end to an inferior stamp of recruit presenting himself to fill vacancies, such as cast-offs from other regiments, or relatives of menial servants.

A Sowar's pay has to meet the following charges:—Chunda, Wordi, Troop expenses, keep of horse and pony, pay of syce, Sowar's own food, and a balance to send to his home. It is in the Commanding Officer's power to keep the Wordi charges from undue extravagance; Chunda, Troop expenses, and share of syce's pay are fixed sums, the keep of horse and share of pony will depend on prevailing prices for grain. and the Commanding Officer can occasionally, by the exercise of a little knowledge and forethought, make good bargains for his Regiment. Government can assist regiments by quartering them in districts where grain and food supplies are cheap and grass is plentiful. Government grants compensation for dearness of food and forage, but this is only when the bazaar rates exceed a certain standard, which is high. It has been fixed in the revised scale for Service that there shall be one syce and pony for 3 sowars; this might therefore be made the peace establishment, and it would be quite sufficient if the grass was plentiful and close. Umballa used to be, and I suppose still is, unable to provide the grass, within a convenient distance, for the number of Cavalry horses quartered there; and probably there are several Cavalry stations similarly off for grass; whilst, on the other hand, in Bundelkund and Central India, grass grows abundantly, and there is enough for the wants of innumerable regiments. Again, Commanding Officers can assist in curtailing the Sowar's expenses by feeding the horses on a judicious mixture of grains of different prices, as gram, barley, maize and oats, whereby the condition of the horses may be equally well sustained at a smaller cost It must be admitted that there is something of the nature of cheese-paring in these suggestions, but they are mentioned to show all that can possibly be done in the way of keeping down expenses.

It may here be noted that these Cavalry Camps of exercise are a heavy tax on the Sowar as well as the Chunda Fund. The wear and tear of Sowar's kit and tent, higher rates paid for grain on the line of march, cost of grass wherever it cannot be procured by the regimental grass-cutters, and wear and tear of horses and ponies, all put together run up a considerable bill. These annual Cavalry Camps of Exercise are very essential; as it is here our future Generals and Staff Officers get their only training in the handling of large bodies of troops. It is also good for the several regiments to be brought together once in a way for some practical exercise in masses. But it is not desirable to detail regiments to these camps more frequently than once in four or five years, as they can derive all the good that there is to be obtained by attending at these intervals of time, and they are saved from the needless expense incurred when they are sent to camps more frequently.

Native Officers and Non-Commissioned Officers.—Promotion to the Non-Commissioned ranks is in the gift of the Commanding Officer, and different regiments have their systems of selection. Generally an examination is held to test the aspirant's qualifications; but the most clever at examinations does not always make the best Non-Commissioned Officer; educational qualifications and examinations are desirable, but should not be the exclusive test for promotions, as is sometimes the case. A Non-Commissioned Officer needs to be an educated, keen and efficient soldier, as also a man of good family, who is respected in the Troop, and has what natives call *rowab.*

Native Officers are generally made by promotions from the non-commissioned ranks according to the class there is a vacancy for. Occasionally a man of good position and family is brought in direct as an Officer on one year's probation, and posted to a Troop of his own class. These appointments frequently turn out satisfactory, but they rob the Non-Commissioned Officers of the steps expected by them, and thus dishearten and disgust them. This method of providing Native Officers needs therefore to be resorted to with judgment, and only occasionally. The senior Troop Officer is responsible for the interior economy of his Troop, and all pertaining thereto, and he has the Kote Duffadar and Pay Duffadar as his Adjutant and Paymaster. The system works well.

British Officers.—British Officers should enter regiments with the intention and wish of making the Regiment their home for some years. Such used to be the case in former years; the officers and men thus came to know one another well, and that mutual confidence and sympathy were begot which formed a strong bond of union. Natives get attached to their old Officers, and work much better under them than with strangers. But in recent years the rewards given to Staff Officers employed on Service have been showered so liberally, whilst Regimental Officers have been left in the back ground, the impression has got abroad that the Staff is the only way to rapid advancement, and the youngsters of the present day join regiments counting the hours when they will be able to get away and find a place on the Staff; this is demoralising from the Regimental point of view; and an evil consequence is that there is a visible depreciation in that bond of *camaraderie* between officers and men, which had a powerful influence for good, wherever it existed in former years, and of which instances are to be found in the history of the Sepoy Mutiny of '58.

The Native Army is a mercenary force of alien races who serve voluntarily; and discipline is maintained and efficiency secured, not by the harsh enforcement of the Articles of War, but rather by the influence of the British Officers, who are known personally to the men, take an interest in their welfare, are respected by them, and have their confidence. The Indian races are peculiarly susceptible to this moral ascendancy of the Britisher. and become as devoted to their able Officers as children to their parents. Such was the nature of the authority of the late Wygram Battye in the Guides; and where would not his Regiment have followed him? We have reason to hope and trust that the Indian Army contains many such Officers on its rolls, although the exigencies of active service have not yet brought them prominently forward before the public.

A book is about to be published by Mr. D. Ibbetson on the Native Races in the Bengal Army. The information such a book should contain is much needed in the Army, as the majority of Officers are ignorant on this subject to a mischievous degree.

The system of supplying the Indian Army with young Officers from the British Service works well, although it has come in for its full share of adverse criticism. The number of British Officers in a Regiment at present is quite sufficient for performing the duties in peace time, and working up the Regiment to a high state of efficiency; but this number is totally inadequate for the requirements of the Regiment on Service. This is generally conceded by all who have considered the question. In the British Cavalry there are about 30 Officers in a Regiment; and it is well known that Tommy Atkins does not need the amount of leading required by Ram Sing and Mahomed Khan; furthermore, the small number of British Officers with a Native Regiment are rendered more conspicuous by their race and dress distinctions, so that there is all the greater likelihood of their attracting the enemy's efforts; hence it is illogical to suppose that 10 Officers are any more than a fraction of the number necessary. The Native Officer makes an indifferent leader in the field (with a few remarkable exceptions); he is wanting in nous, and the men have not the same confidence in him as in the Britisher. The British Officer is invaluable and all-important in the field with Native Troops; this has been proved on Service a hundred times. The expense of keeping up during peace the number of Officers that would be necessary on active service, would be high and prohibitive. A practicable way of meeting the difficulty when the necessity arises, is for Government to give commissions to Non-Commissioned Officers in the British Cavalry who have passed the Higher Standard examination in the Native languages, and the usual educational tests. By this method a large number of qualified British Officers could be created at a moment's notice, as every British Cavalry Regiment that comes out to India, would soon have numbers of qualified Non-Commissioned Officers ready for such Commissions, if it were known that such appointments would be obtainable on war breaking out. There are nine such Regiments serving in India, and they usually have a number of gentlemen's sons going through the ranks with the idea of working their way to Commissions. There is no reason why each of these Regiments should not be able to furnish six such qualified Non-Commissioned Officers for Commissions in the Native Cavalry on the outbreak of war, without diminishing their own efficiency, as they invariably have a large number of qualified men that their Commanding Officers would be glad to have opportunities of promoting into the non-commissioned rank.

Every Native Cavalry Regiment going on Service should be provided with at least six extra Officers over and above the normal complement during peace; these additional Officers being obtained by Commissions given as suggested above, and by some transfers from other native regiments not nominated for service. Such Officers would necessarily lack the long acquaintance with the men which is so desirable to ensure the full confidence of Native troops, but they would be the junior Officers; whilst on the other hand they would be thoroughly well drilled and qualified to lead in action, and being associated together in the vicissitudes of campaigning, would more readily develop that closer tie of comradeship. This would be preferable to filling a Regiment going on service with a parcel of raw youngsters just out from Home, as has been done.

Arms.—The Arms of Native Cavalry are the Sword and Carbine; and it is to be hoped all the Regiments will soon be supplied with the

Martini-Henry, a very effective weapon. There are a few Lancer Regiments. It would add to the efficiency of the Force if all regiments were furnished with lances in the Front Rank, whilst carbines might be confined to the Rear Rank. The lance is a most formidable weapon in the charge, and its *moral* effect is very great; this has been proved in war. Battles are won, not by the number of killed and wounded, but by the moral ascendancy one side attains over the other, and therefore it would be indiscreet to discard, without sufficient reason, anything that will materially contribute towards attaining this subtle power The lance should be nine feet long, which is the Regulation size; this gives plenty of reach, and is a handy length to wield. The Rear Rank do not require lances, as they are not brought down to the *engage* and used in the charge, and furthermore the Rear Rank will be required on occasions to dismount rapidly and act on foot with their carbines, and in such cases the presence of the lance would be an encumbrance.

Regiments armed with lances in the Front Rank only, may dismount three men in each section of the Rear Rank as laid down in the Cavalry regulations or the whole Rear Rank may be dismounted thus:—On the command, "Rear Rank with carbines, Dismount," the Front Rank will go "Fours Left," at the same time opening out to allow entervals for the Rear Rank to come up. The Rear Rank at the same time move forward from the right of fours to the left flank of their Front Rank men, dismount and hand over their horses. The led horses can move to their original front by going "Fours Right," the Front Rank will now be composed of Nos. 1 and 2. each leading their rear rank horses, and the Rear Rank of Nos. 3 and 4 leading their rear rank horses. On the command "Mount," the whole will go "Fours Left" again to admit of the Rear Rank men getting their horses. This method of dismounting is equally applicable in Line or Quarter Column, or any formation.

The Russians have armed all ranks in their Cavalry with revolvers, in accordance with the system recommended by Denison in his book on "Modern Cavalry"; but experience proves that the revolver is more dangerous to friend than foe in the hands of a man not habituated to its use. As the Native Cavalry are already under-officered, it is not advisable to put in the hands of Sowars a weapon that is calculated to emphasize this weakness by placing the Officers between two lines of fire. Swords and revolvers are the legitimate weapons of Officers and scouts, and they should be well practised in the use of these arms.

The question of how the sword and carbine should be carried on horseback, has been agitating the authorities lately, and the conclusion arrived at is that the sword should be attached to the saddle, and the carbine slung on the man's back when going into action. This is a retrograde step. If the sword belt is furnished with a hook on the left side and the frog with an eye or D, the sword can be hitched up easily, and in this position will not impede the movements of the dismounted Horseman any more than the sheathed bayonet does the Infantry man. The Cavalry man and his sword should never be separated. The carbine, on the other hand, is an oppressive load when carried slung, and one needs to wear it thus for an hour at the trot to appreciate how hateful it is to the wearer. The oppression to the chest caused by it is of the same nature as that caused by the old knapsack cross-belts over the chest of fifty years ago. A horseman with carbine slung on, cannot handle his sword with perfect freedom ; let those who doubt this do the Sword Exercise at the gallop with the carbine slung. Again, there is an idea that a Cavalry man going into action must not be separated from his carbine, and that this misfortune must be the consequence if the rider is thrown and his horse runs away. Now this is going a long way to find an argument to bolster up the fad for slinging carbines! Not one horse in a thousand throws its rider at the critical moment of the attack. Horses get shot and come down, and then cannot run away with the carbine ; or a man gets shot and falls and the horse escapes, but the man is then in no urgent need of his carbine. In the rare instances of a man being thrown from his horse at the crisis of an attack, he can readily possess himself of a carbine, if he is so minded, from among the slain which there would be in a serious encounter, for it would be easier to pick up a carbine than unsling one. Look at it in any way you please, there is not sufficient reason to support the idea of handicapping the swordsman and lancer with a slung carbine at the critical moment of attack, when he needs his arms and body to be as pliant and unrestrained as possible. When an athlete is about to exert the full powers of his body, he strips himself of all encumbrance ; and when the Navy go into action, the men strip to the waist, and do not buckle up and truss themselves. The right place for the carbine is in the bucket, and not on the man's back.

Equipment.—The equipment of Native Cavalry, on the whole, is very good. The method of carrying the sword, in a scabbard of wood and leather, and supported by a frog in place of slings, is excellent. Leeman and Gatty's fast-dyed khaki drills are durable, and the best for service and summer wear. The uniform is roomy and admits of extra warm clothing being worn underneath if desired ; but perhaps the blouse is just a trifle too loose in the Bengal Cavalry. Sowars should wear ammunition boots or highlows and putties, this being the most serviceable. Long boots should be discarded in the ranks by such regiments as retain them, as the Sowars cannot walk a mile in them without getting footsore ; the long boots are not fit for service, and in consequence are useless, and it is putting the men to unnecessary expense making them keep up both kinds of boots.

Sowars should wear socks, as these are a great comfort in the cold, and they are necessary to save the feet from shoe-bites ; for it should be a custom for Cavalry to dismount at reasonable intervals of time, and lead their horses for several miles on long journeys and all duties of a trying nature, as this saves the horses greatly, and is beneficial to the men. It is notorious that horses break down rapidly from overwork and other hardships of campaigning, and effort should therefore be made to lighten their work whenever possible.

There is room for improvement in the Sowar's cloak ; it might be made for warmth without being so cumbersome as at present, and further be furnished with a light waterproof cape and hood. The spurs and buckles of accoutrements should be of brass, which is easier to keep burnished than iron is.

Saddlery.—Many regiments advocate the single bridle, but it is beyond doubt that the double bridle preserves a horse's mouth better, and therefore is preferable.

The ideal saddle is a desideratum. The saddles used by different regiments are good in their way, but none are perfect. Saddles are usually made in three sizes for military purposes, and what we require is a saddle that can easily be adjusted to fit the great variety of backs to be found in horses, and that is capable of being easily re-adjusted to fit the horse when he loses condition: the weight of load to be distributed from behind play of shoulder to the last rib; the side boards rather shorter than the present Regulation pattern, which is good in shape but two or three inches too long, for if long then the horse chafes behind, and if the boards project in front beyond the tree, the play of the shoulder is interfered with. Nothing can be better than a roomy hunting saddle properly fitted; but a horse's change of condition on Service would necessitate such constant refitting of the saddle that it would be impossible to carry out. A pattern saddle must be arrived at that does not fit the back too closely, and will more readily adapt itself to the changes in the condition of a horse's back after it has once been fitted.

The various contrivances in saddles brought out from time to time are good in their way, but do not meet the difficulty completely. The method of letting in pieces of numdah under the panels is clever, but such saddles fit close to the back, and the adjustment of the numdah needs to be very exact, more so than a Sowar can manage for himself, and it must therefore be done by the professional saddler, who is not always available. High hollow withers are most difficult to fit and keep free from galls. Careless riding, long continued load, and saddles off too soon after work, &c., will give sore backs even when saddles fit properly. The best safeguard is for Squadron Commanders to constantly inspect their horses' backs and saddles, and take remedial measures on the first indication of mischief. In this matter the adage is literally true that a stitch in time saves nine. There are numerous little contrivances one or another of which frequently affords a horse relief from a threatened back, such as a day's rest, seating out the pad, removing the numdah, or putting on a extra one, &c

The high cantle is good, as it keeps the rider's weight in the centre of the saddle, even when he rides carelessly on being fatigued; it also keeps up the valise or kit, attached behind the saddle, from causing a sore by pressing on the horse's spine.

Horses usually fail in the fore legs. As a rule this is their weakest point, and "Smith's Veterinary Hygiene" informs us that a horse's fore legs support $\frac{3}{5}$ths of his weight; it naturally follows that we should endeavour to so adjust the load as not to throw an undue proportion of the weight on the fore legs. The cloak and kit carried in front of the saddle should be carried behind; this would also help to ease the pressure on withers, the seat of the worst forms of sore back, and at the same time enable the bridle-hand to assume its right and natural position. In marching order the horse blanket should be folded and put on the horse's back between the numdah and saddle, or it may be put over the seat of the saddle and kept in place by the surcingle. If there is no numdah between the blanket and back, the creases in the folds of the blanket will press unevenly and cause a sore back.

It may here be mentioned that a principal cause of the Cavalry horse breaking down is the load he has to carry. Nothing should be carried on the Troop horse that is not absolutely necessary. As a rule he is loaded up unduly. Some Regiments carry a complete set of shoes and nails on the horse, in addition to other needless things: this is not wanted. In no Troop do they drop more than a couple of shoes in a hard day's work, and therefore if the Troop Farrier carries a spare set of shoes of sizes, it should be ample for all likely requirements.

This question of weight leads to the theoretical conclusion that Cavalry men should be as light weights as possible, and this would be quite correct if all fighting were carried on with firearms; but in the charge and *melée* length of arm and muscle are needed; and it is the knowledge of having this power in good degree that enables Cavalry to charge home with that energy and determination so essential to success. The heavy-weight giant is quite out of place in Native Cavalry; the stamp of horse we have could not carry the weight on service. The ideal for Light Cavalry is a wiry, muscular but slim man, about five feet 10 inches high, and 10 stone weight; such a man is sufficiently powerful to handle sword or lance perfectly, and his horse would not be prematurely broken down by being over weighted. The average Country-bred in the Native Cavalry is well up to this weight with the addition of Military accoutrements. All Regiments have Camel Sowars, usually one per Troop; they are well adapted for carrying the pioneers' tools and other heavy implements for demolitions, &c., aud are able to keep up with the Regiments when on a raid.

Horses.—The horses in the Native Cavalry are on the whole very satisfactory, and generally up to the weight they have to carry. Australia is capable of supplying all the wants of the mounted branches of the Service in India, but the prices run high, and Native Cavalry cannot afford to buy more than a small number of these horses for the heavy weights; furthermore, the Australian requires more grain than the Country-bred to keep him in condition, and this is another reason for his being considered an expensive horse. Some Regiments obtain Arabs and Persians from Bombay, hardy animals, capable of great endurance, but often small and not always up to the weight they have to carry. The chief source of supply is the Country-bred of India of all degrees of quality and fitness, ranging from very good to very bad.

The system of purchase through Remount Committees lately instituted was good and must work well, provided that the members of the Committee are well selected, and the remounts are apportioned to the different Regiments by lot. If the Remount Agents are well fitted for the work, they will buy all the best horses to be had at reasonable prices. Regiments purchasing for themselves could not do better for the Service, and they might easily do worse, if not favoured by having a good Remount Officer.

What we require in the Troop horse is a good constitution, stout limbs, sound feet, and his being up to the weight he has to carry. A pretty head and well set on tail are not absolutely necessary, whilst on the other hand a straight shoulder and goose rump may frequently be seen in a horse eminently suited for the ranks. There has been a tendency in some cases to pay too much attention to the pretty points of a horse, to the neglect of points essential in an animal for active service. Experience shews that most casters are struck off for failing in their legs between the knee and sole: most of the evils that Troop horse-flesh is heir to are located here. In purchasing remounts, therefore, special attention should be paid to these limbs; a horse with short cannon bone, big clean-cut sinews, large square fetlock, good pastern, and sound healthy feet, will generally have all the other requisites for a good Cavalry horse. There has been a sad tendency sometimes to sacrifice efficiency for height and appearance, by purchasing long lanky weeds with pipe-stems of legs that would break down the moment they are put to severe work.

The prevailing faults of the Country-bred are being narrow-chested and light limbed. Spavin is the prevailing disease, but this does not often necessitate casting. A horse fired for a spavin generally works for years.

The selection of remounts is a very important matter in connection with Cavalry. It is the horses that invariably break down on service, and one cannot be too careful in selecting animals with good constitutions, stout clean-cut limbs, and calculated to hold out under the trials of a severe campaign. Denison states with truth, "the value of Cavalry depends upon the quality and condition of their horses. If these are bad and out of condition, the Cavalry will be correspondingly depreciated in value. In fact, the horses are far more likely to be laid up, to be destroyed, to fall off in strength than the men, but if they can only be kept ready for work, the men will not be wanting."

The question of whether the Native Cavalry are properly mounted up is just now exercising the minds of those connected with the Service. In the opinions of those who are not pessimists and have had opportunities of judging, the Native Cavalry are better mounted now than they were in former years. The horse of the present day has more bone and size, and the Ranks are not so crowded with superannuated screws as used to be tolerated in former times. The increased price of horses in recent years has undoubtedly raised difficulties, and the resources of the Chunda Fund are strained. The supply of horses has not been equal to the demand, and this has had something to do with prices running up; but the chief reason is undoubtedly the general rise in prices of all commodities, or what is the same thing, the depreciated value of money in India.

When Rs 200 was fixed as the Chunda price for horses, they used generally to be got at a smaller figure, and some if not all Regiments used to let off the Sowars paying their subscription to Chunda for a few months now and again, whenever the Chunda fund was in a flourishing condition with a good sum in credit. In those days the Government wants were supplied by the expensive studs kept up at Buxar, Saharunpore, and elsewhere, and the Native Cavalry had the supply of Country-breds all to themselves. Since then, however, the studs have been broken up, the C.-B. has improved under the Government Breeding Operations at the present working, Government have entered the market as purchasers, and prices have gone up.

The increase of one squadron per regiment of Native Cavalry, which was made 4 years ago, raised the demand for horses, and disturbed the balance of supply and demand for a time; but this should right itself gradually. Another circumstance that contributes towards this deficiency in the supply is the large number of mares which yearly pass into military service, and thereby reduce the breeding stock in the country, as these mares are not used for breeding purposes while in military service, and pass their lives in an unreproductive existence. A rule to stop the purchase of C.-B. mares for military purposes would prevent this. It is well known that during the late Afghan War, when the pack transport was failing, large numbers of mares were purchased in the Punjab by Government to supply the pressing wants, and the result was that breeding in the Punjab was seriously affected for some years

The idea of Native Cavalry rearing their own remounts can come to no practical good. Regiments that launch forth in this line will find their military duties suffer, men will be detailed to look after the young stock, and the whole energy of the Regiment will be devoted to making the new venture pay. At present it is only an empty theory that a better developed stamp of remount will be secured, and that there will be a saving to the Chunda. There is no test case to support the idea that a great improvement will result on the institution of regimental young-stock farms, an improvement sufficiently great to warrant the certain expenditure necessary to start it. Being underlimbed is not a fault confined to C.-Bs. brought up in the ways of this country. We frequently find light-limbed animals amongst Arabs, Walers, and the old Government Stud-breds of former years. No doubt it is very beneficial to young stock to be allowed to run about free, but there is reason to believe the estimated benefit is too highly rated.

The Indian Country-bred is a most enduring and hardy animal as a rule, and there are records of surprisingly long journeys and feats of endurance performed by it; but the animal is undoubtedly in want of more bone for military requirements, and the only practical remedy for this is for Government to provide suitable stallions, as is being done now, and the beneficial results will show in a few generations, in fact, are showing now. More than this cannot be expected.

Ponies.—The Native Cavalry are, as a rule, well provided with grasscutter's ponies of a good stamp; and these animals would be available for supplying the Regimental Transport on service, as all regiments keep an excess of ponies over the number allowed by the revised Equipment Tables for Service.

Some regiments have a large percentage of mules, very superior animals to ponies, being very hardy, and able to thrive on inferior food; but their prices run high, and this puts off the majority from taking to them. But there is reason to believe the mule is really the cheaper animal in the end, notwithstanding its primary costs. Leaving out of the question the mule's superior carrying power, more hardy constitution, longer life, and more simple stable management, requiring neither grooming nor shoeing, it is said on good authority that a mule will keep condition on a daily allowance of one seer of gram when a pony will require two seers, and that this is the method of feeding practised in regiments that have mules. By this means a saving is effected of about Rs. 15 a year, and in three years the difference in prices between ponies and mules can be made up. The truth of this assertion remains to be tested, but one can quite believe it, for going a step lower down the scale, have not we seen pack donkeys doing hard work during the late Afghan War in the neighbourhood of Kandahar, and keeping their condition on a diet of rags and ashes from dust heaps?

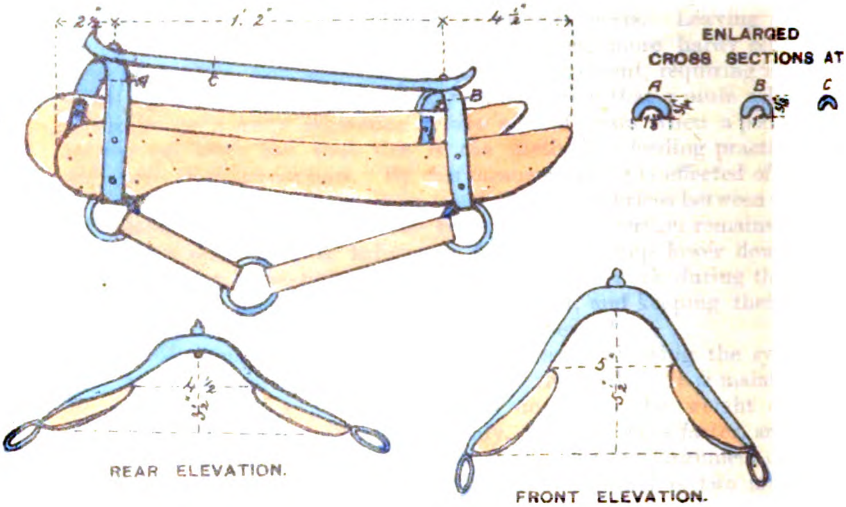
An abominable custom sometimes obtains of allowing the syces to ride the laden ponies, seated on the top of the loads. It is maintained by some that it is an advantage to do so, as the weight of the man helps to balance the load evenly, the pony goes faster, and the syce arrives in camp fresh and fit for work. But no argument of this sort can convince one that where the pony's full load is two maunds, it is an advantage to the animal to carry three maunds. This practice of riding laden animals has a great deal to do with the galled withers so common in pack animals.

Carts and pack Saddles.—Some regiments have tried the experiment of introducing wheeled transport in place of pack, for the conveyance of regimental baggage on the line of march, the forms of carts being varieties graduating between the Maltese cart and the ekka of the country. By the use of a light cart the loads of three ponies can be drawn by a single animal, and without the usual risk of a sore back. If pony carts could be substituted for pack transport, an immense advantage would be gained, as the latter is a most costly method of conveyance, the quantity conveyed being greatly reduced, and the risk of sore backs and break-downs proportionately increased. Unfortunately, wheeled transport cannot be relied on for regimental purposes in the Cavalry, for in Asiatic campaigns, where the countries are uncivilized, roads are few and of the worst description, and the country generally difficult, the chances are that the Cavalry force, operating more or less as a detached body away from the main Army, could never count on its camp equipment coming up across country and over the long distances usually traversed, unless provided with pack transport. When there is any necessity for it, camels may be substituted for ponies; the former do more work in proportion to their wants than the latter, but they move more slowly.

Government have now adopted a service transport cart, in pattern like a tonga, drawn by a pair of ponies, and it is said to promise well for the General Transport Service.

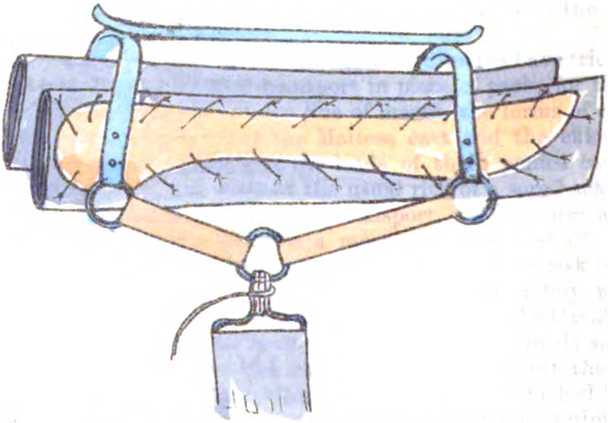
A good pack saddle for the Native Cavalry is much needed. In the late Afghan war the Madras pack saddle had a high reputation, but it

BARE SADDLE-TREE.



REAR ELEVATION.

FRONT ELEVATION.



PACK SADDLE WITHOUT ARAKGIR.

was very heavy, and the price was very high, far higher than a Sowar could possibly afford from the scanty remains of his pay. No doubt the Madras pack saddle could now be supplied wholesale at a much smaller cost. As this question of a serviceable pack saddle is so intimately connected with the efficiency of regiments, it is surprising that a committee of competent Officers has not yet been appointed to find a solution to the difficulty, Most Native Cavalry use the ordinary *chhai-soonka* of the country, which weighs on an average 30 lbs. It is a coarse arrangement and prolific cause of sore backs, particularly when the loading is done carelessly, as is generally the case.

The following is a detailed description of a cheap pack saddle that has been tried and gave satisfaction (*vide* accompanying sketch). The side boards are of same shape as for the universal saddle, but reduced in length ½″ in front and 1½″ in rear. The cantle is brought forward ½″, and the boards are fitted ½″ closer together than in the tree of the universal saddle. The iron work is of wrought-iron hollowed out (*vide* sketch of cross sections), which gives it strength and lightness on the principle of angle-iron. The several measurements of the parts are given in sketch; the iron portions being coloured blue, numdah grey, leather sienna, and wood sienna streaked. The padding is of thin country-made numdah sheeting, sold in pieces measuring 40″ × 80″ and weighing 1½ lbs. each; one piece cut up and folded 10 deep is stitched on to the panel boards. Two pieces of this numdah folded six deep are stitched on to a sheet of coarse canvas or *tánt* and form the *arakgir*, measuring 25″ × 40″. The weights of the several parts are:—Naked tree 8 lbs. plus 1½ lbs. numdah padding; *Arakgir* 6½ lbs. The whole, including girth, straps, &c., weighs about 20 lbs. No *chhai* is needed, unless hard angular goods are to be loaded. The addition of a breeching is necessary for most mules and some few ponies; it should be of broad smooth leather and well soaped.

Tents.—The single-fly tent at present generally in use in the Bengal Cavalry is too small, and the material is not the most durable. There is room for improvement.

The occasion never arises when it is required to detach two Sowars only on any duty, and there is no necessity for one small tent for each couple of men or *jori*. A larger size tent for six men may be constructed, to give more cubic space per man, and yet proportionally weigh less than the small tent now used. The *khaki* tents now being made experimentally, appear to have several points in their favour.

Training of Horses, and Stable management.—The training of horses and stable management are good on the whole, but there are a few points on which a little more consideration is needed. A certain percentage of remounts go wrong in training, either become obstinate brutes, or else violent run-aways; and this is often due to want of temper and judgment on the part of the trainer. The Rough-rider's long whip is frequently used hastily, and spoils every nervous excitable horse subjected to it. A few horses no doubt are born ill-tempered brutes that no amount of proper treatment will ever make satisfactory animals, but the percentage of these is a mere fraction.

The German Cavalry are very successful in the breaking in of their horses, and we could learn useful lessons from them. No doubt the Germans are favoured with a more lethargic horse, readily amenable to discipline; but this is not the only reason for their success; their system is good, and based on practical experience. None but selected riders should be entrusted with the training of young horses; men with good hand, seat, temper, and judgment. It should be looked upon as an honour to be selected for this duty, and it should carry with it some personal advantage, such, for instance, as being excused guard duty. Great patience is requisite with young horses. Obstinate animals should be put on a reduced allowance of food, and exercised twice a day, until they become tractable; and the long whips should only be used as a last resort.

We might improve on the system of feeding horses generally practised in Native Cavalry. The plan of giving three seers of gram from year's end to year's end is a mistake. The horse needs change and variety of diet, just as well as man does. The practice now gaining favour at Home might be introduced in stable management in India, namely, to reduce the horse's diet in the non-drill season, and make a corresponding increase to his corn during the working season. Gram is a highly nitrogenous food, and horses fed upon it, and not kept in hard work, soon get foul. Most Native Cavalry horses will keep condition on two seers of gram during the summer and rains when out of work; and a corresponding increase of grain should be given during the drill season in winter.

Veterinary Surgeon Poyser, in his Prize Essay on "Stable Management in India," gives excellent hints. and amongst others, urges the advisability of feeding horses on mixed grains, which should be given in the form most suited for digestion. Two-thirds gram and one-third barley is a good proportion; with bran mashes on Saturday evenings The barley must be parched and crushed, and the gram crushed and damped for feeding, or the horse will not derive the full benefit from the grain he consumes. Oats are not plentiful enough in India to be considered a staple article of food for Cavalry horses; but it is the best food for horses, and the wonder is that the demand has not yet created a supply, for the soil and climate are suited for its cultivation

The horse's stomach is small, the feeds therefore need to be frequent and small; four feeds a day are preferable to three. The watering of horses also has a good deal to do with their keeping in condition; horses must not be stinted in their water; and soft water from tanks and streams is preferable to hard water, usually from wells. Changes of diet should be gradual, and horses need salt daily. Occasional feeds on green fodder, such as *kirby*, sugarcane, green gram, carrots, lucerne, &c., have a good tonic effect and are beneficial.

On Service horses lose condition rapidly from overwork, exposure, and bad food, and this is the most serious difficulty to be contended against; once condition goes down on service, it is impossible to recover lost ground without prolonged rest. Cavalry Officers need, therefore, to look after their horses' welfare and condition most anxiously, and they need to study and practise all the little contrivances that go towards sustaining a horse. Close on the heels of hard work and loss of condition, and frequently the results thereof, follow non-fitting of saddlery and sore backs, the next most fruitful destroyer of Cavalry on service.

The practice of shoeing should be conducted on lines suitable for the requirements of service. Horses and ponies shod up fore and hind look very smart and well; but is this necessary? Can these requirements once created always be supplied? A six months' supply of shoes and nails amounts to an alarming weight; and if a Regiment were ordered on service to Afghanistan, out of reach of railways and easy means of transport, it would be found impossible to keep the horses and ponies shod up. All horses must be shod in front, this is known to be absolutely necessary; but a large percentage of animals having good hoofs, can work without being shod behind in a dry climate. It is also known that horses require to be accustomed to work without shoes to keep the hoofs in hard condition, as the presence of shoes protects the feet from the wear and tear necessary to develop the resisting power of the horn. It is therefore advisable to shoe new horses in the fore feet only; and hind shoes should only be given to those animals that are found after a fair trial to have weak brittle hoofs incapable of working without shoes. This would give the farriers less work to do, and therefore it should be done better, and that common evil of Indian shoeing called *dumping* the hoof should cease to exist.

Drill and Instruction.—The instruction of recruits is generally carefully and well carried out. The Riding School, however, attempts too much; there is more dragooning introduced than is healthy. It seems we do not make sufficient allowance for the difficulty the Indian village rustic experiences in learning the meanings of the innumerable words of command in an unknown tongue. To give one instance, take the complicated commands in the bending lessons of the Double Ride; it is enough to confuse a Senior Wrangler although in his own language! The practical result is that the Riding Instructor is too much preoccupied giving his words of command correctly and keeping his own head clear, and he is not able to attend to the riding of his squad; consequently, movements are gone through in a slovenly manner. And when after a deal of hammering away the recruit ultimately grasps a glimmering of what he is required to do, he has then been the full time in school allowed for it by Regulations, and he passes on in a state of semi-instructedness into the Ranks, to again forget all in a few days, as only a small fraction of the Riding School words of command comes of use outside the school.

The Double Ride may with advantage be abolished for Native Cavalry; the only part in it of practical use is "Right and Left Turn," which trains remounts to face horses coming towards them, and this movement can easily be introduced into the Single Ride with two squads. Great simplification may also be effected in the Single Ride. On the other hand more attention needs to be devoted to jumping and riding across country with skill and judgment.

A course of gymnastics, comprising vaulting horse, climbing rope, wrestling, clubs, running, jumping, swimming, and wrestling on bare backed ponies, exercises a beneficial influence in the training of recruits; it develops their strength and agility, and also tends to sharpen their wits by waking them up, in which traits the Indian village rustic is rather deficient.

The Regulations lay down certain courses of instruction in Squadron Drill and Musketry that trained soldiers have to be put through annually; and they portion off the winter months for Regimental and Brigade Drills, the further details being very properly left to the discretion of Officers Commanding Regiments and Brigades. There is a tendency, however, occasionally to devote rather too much time to Parade movements and musketry, to the neglect of Outpost, Reconnaissance, Contact Squadrons, and Loose-practice with sword and lance.

With regard to the sword, it is necessary to repeat here, what has already been mentioned, that in former years Native Cavalry were celebrated for having sharp swords, and using them with astounding effect; but there is a serious falling off in this acquirement in the Native Cavalry of the present day, and the reason is not far to seek. Sowars have no practice in this important branch of their professional training now-a-days. Loose-practice with sword and lance is almost unknown in many Regiments. It is remarkable how feeble and harmless the unpractised Sowar is with sword or lance; and it is equally remarkable what vast improvement he makes with one hour's practice a week. This plan of weekly practices has been carried out in a certain Regiment for a year, and the improvement in the handiness of the horses was as marked as the skill of the men. But it must be added that particular attention must be paid to the horses not being struck on their heads during the excitement of loose-practice combats. A recent G. O. has taken notice of this failing in the Sowar's training, and the institution of prizes and other remedial measures have been adopted which should before long repair this defect. Loose-practice or mounted combats for the attainment of skill with the sword and lance has heretofore been neglected, whilst on the other hand tent-pegging is carried on sometimes to an injurious extent. After a recruit has been properly trained at tent-pegging and lemon-cutting on an old caster, there is no necessity for him to practise this oftener than once a month; this is sufficient to keep his eye in; and more frequent practice generally spoils the horse, it makes him impetuous, violent, and often a jibber, and is a fruitful cause of developing incipient spavin.

For tent-pegging spears should be as like the lance as possible, that is, with the spear-head attached to the thin end of a bamboo shaft nine feet long, and held at the grasp which is 66 inches from the point. Without all this there is no benefit in the practice of tent-pegging, for the weapons generally used at the present day, held at all lengths and differently balanced, are no training for the handling of the service lance. The primary object of tent-pegging and lemon-cutting should be to increase the dexterity of the Sowar in handling his service weapons. At the Assault-at-Arms held recently at Muridki the rules for conducting the mounted combats were peculiar, and the practice swords and lances used were of all lengths and weights, thus showing that the ideas on these matters were in a crude state.

There is an Annual Tent-pegging Competition for Bengal Cavalry. Why should not there be a series of mounted contests with swords and lances, shooting competitions, and all forms of sport that contribute to the efficiency of Native Cavalry, held annually at several central positions conveniently situated for competitors?

The following is given as an example of a good distribution of drills and exercises a Regiment should have weekly. All the duties of a Cavalry soldier are arranged for, and sufficient time allotted to each to admit of the requisite degree of proficiency being acquired; and the Regiment is systematically put through the whole course of training in all its branches at regular intervals:—

Order of Parades for the Week.

MONDAY MORNING --Squadron drill under Squadron Commanders. To brush up the men in the A B C of their mounted duties, and comprising instruction in Cavalry Regulations, Part II., and sword and lance exercise, &c.

TUESDAY MORNING.—Musketry under Squadron Commanders. Communicating drill for N. C. Os. under the Adjutant; half the N. C. Os. being thus brushed up on alternate weeks, whilst the other half are instructing in their Squadrons.

TUESDAY AFTERNOON.—Tent-Pegging and lemon-cutting, &c. For one Squadron each week, that is once in four weeks for each Squadron.

WEDNESDAY MORNING.—Commanding Officer's parade for Field Exercise—Cavalry Regulations, Part III.

THURSDAY.—Holiday.

FRIDAY MORNING —Commanding Officer's parade in Drill order for exercise in Cavalry Regulations, Part V.

SATURDAY MORNING.—Fortnightly inspection of arms, accoutrements, saddlery, &c.

Fitting of saddlery and inspection of ponies, pack-saddles, and marching gear on musterday. Swimming horses and instruction in Cavalry Regulations, Part IV., practised once a year when opportunity presents.

Target practice and match-shooting during the daytime whenever desired.

Theoretical examinations on drill, musketry, &c., of N. Os. and N. C. Os. once a week.

This arrangement has been tried and gave satisfactory results. It gives a reasonable amount of work to all concerned, and is sufficient to attain a high degree of efficiency.

The Native soldier requires constant reminding and brushing up to keep him up to the mark, and he rapidly gets rusty in any exercise he has dropped for a few months. This is seen in a pronounced form in men just back from furlough; they appear to have completely forgotten all their training during their absence at home; but they soon pick it all up and get into the old swing again after a short period of schooling. A steady, methodical arrangement which puts the men through all their courses of training at repeated short intervals of time is, therefore, to be approved of, and this suits the taste and disposition of the Native. This naturally leads one to doubt the advantage of having the annual course of Squadron Instruction as at present laid down. Of course, if all the instruction then given is included in the weekly drills, well and good; but there is reason to fear that in some cases the supposition is acted upon that the course having been carried out as laid down by Regulations, the instructions it comprises may be banished from the mind for the year. Again, this system of Squadron Instruction is suited for the Continental armies that get their crowds of conscripts all at one time, and who go through the whole course of military training together; but this plan is not so well suited for Native Cavalry, where recruits are enlisted in driblets as vacancies occur, and there is one perpetual drilling up of recruits and men from furlough in small batches all through the year.

The new Regulations for Musketry Instruction are a decided improvement on the old, and we are now feeling our way to a satisfactory course of practical instruction in this very important branch of a soldier's education. The firing line is best under control when the men are sufficiently in hand to deliver effective volleys, and therefore this form of fire is especially practised. For encouragement, prizes should be awarded to the best individual shots in volley firing. This could be ascertained by firing volleys in squads of four men, each man having a target to himself (all ranges have four sets of targets now-a-days), the individual scores could thus be obtained without any difficulty. The Loyd-Lindsay Competition was instituted wich the laudable desire of improving the shooting in Regiments by a very practical test of efficiency; but it is to be feared that, while a few selected men are brushed up to a high state of excellence, the whole regiment is proportionately neglected to the extent of time, energy, and ammunition expended on the preparation of the selected team.

The want is felt of an established system for the instruction of a certain number of men per Regiment in gun drill, the use of dynamite, and methods of hasty demolitions, such as all Cavalry Regiments should be able to carry out when the necessity arises.

Finally, some impetus needs to be given to the selection and instruction in Regiments of men of light weight mounted on picked horses, who are good riders, educated, intelligent, and have the requisite grit, to act as scouts that will penetrate the enemy's lines and procure valuable information, trusting to their horses, wits, and revolvers for safety: an honourable occupation, bearing great risks and high rewards.

A discussion of Regimental, Brigade, and Divisional Drill hardly enters the subject of this paper, as they are framed for the Cavalry of the British Army, and are equally applied in the Native Cavalry without any reservations or distinctions, and on the whole suit very well. The Regimental Drill of the present day leaves little to be desired; the improvements and simplification on the old Pivot Drill of a few years ago are beyond measure, and there is no matter that calls for special notice from a Native Cavalry point of view.

THE EMPLOYMENT IN WAR OF NATIVE CAVALRY.

On entering this branch of the subject the question has to be considered as to what extent the loyalty of the Native Cavalry can be trusted.

They are alien mercenaries, and from the times of the Romans such troops have been regarded with distrust and suspicion. It is otherwise, however, with the Rank and File of the Indian Cavalry who have their homes and property in territory under British Rule, and they are practically a part and parcel of the British Empire, governed by a just and enlightened Government, under which their leading countrymen are given a share in the administration of affairs, and are from time to time raised by appointment to posts of responsibility and trust.

The Native Cavalry are loyal, and are not to be bought over by money; nor are they open to the same inducements to corruption as prevailed with the mercenary forces of ancient days. The money invested in their Regimental *assamies* is some guarantee for good behaviour, as a man will calculate the consequences before he plunges into a mad enterprise with the certainty of sinking his *assami* money. Furthermore, the majority of the men in the Native Cavalry have landed property and possess shares in their villages; they are the gentry of the country, and not naturally disposed to risk their all by joining the irresponsible and discontented spirits of large towns who have nothing to lose and much to gain by sedition and disorder. We may, therefore, without hesitation, conclude that any serious disloyalty could not spring up spontaneously, but would only arise from strong political influences. Political influences which put the minds of the people out of gear and disturb the land cannot spring up in a day; they take time to mature and spread over the country, and they cannot be kept hidden from the Authorities, but will give ample warning when anything is brewing. Repeated defeats and disasters in the field may in the end impair the staunchness and devotion of Native Cavalry to the British Power, and drive them very naturally to seek, by a process of judicious "hedging," to obtain favourable terms for themselves from any Power they may consider decidedly in the ascendant, and in a fair way to seizing the sovereignty of their country. But until such contingency arises, they may be trusted to continue loyal under the severest trials.

The Warlike qualities of Native Cavalry.—To form an estimate of the qualities of Native Cavalry, it is necessary to compare them with a recognised standard, and note where they are up to the mark and where deficient. Native Cavalry are, taken all round, as well drilled and steady on parade as European Cavalry. On Outpost duty and reconnaissance their sight is generally more practised and superior, and they will detect suspicious objects at a distance where the European will see nothing. The Native fails in judgment of how to act under strange circumstances when thrown on his own resources; but there are exceptions to this rule, and, of course, when the occasions arise, only selected men, known for their aptitude would be detached on such special duties. In a stern fight the Native, left to shift for himself, is far behind the European in that self-reliance and determination for which the latter is distinguished, but the Native, led by an Officer he respects and is devoted to, is capable of the most fanatical heroism; history affords us numerous instances of this. He is a born rider, and his physique and activity are good, for we have a large field to select from in comparison to our requirements. On service the Sowar's wants are very few in the matter of food and creature comforts; he stands fatigue and severe temperatures remarkably well, and he is a cheap article to provide and maintain. To sum up, everything considered, Native Cavalry are invaluable to Government, and well worth the cost of their maintenance.

The Cavalry of the Native States for Imperial Defence.—The Cavalry belonging to the Native States' armies, and now being reorganised under the superintendence of British Officers on the model of the Government Regiments, are intended to serve as auxiliaries in the defence of our Frontiers, whenever the necessity for their employment may arise. It is not to be expected that these Regiments will reach so high a state of efficiency as the Government Regiments. They will not have the desirable complement of British Officers considered necessary to give backbone to the structure. When these troops are employed on the defence of a Frontier, it will be advisable to distribute them wherever required along the line of communications, and thus set free the Government troops to swell the force at the front in the immediate proximity of the enemy. Or, better still, these Native Contingents might relieve Government troops of some of their duties in the neighbourhood of their own States, by taking military charge of districts that are not of vital importance, and thereby setting free more Government troops to be pushed on to the Frontier.

Requirements in case of war on the N. W. frontier.—In discussing the employment in war of Native Cavalry, it has to be noted that the arrangements necessary will depend greatly on the seat of war, whether in India or elsewhere; the nature of the Foe, whether badly armed Asiatics or a 1st class European Power; the probable duration of the campaign, whether a couple of months or a couple of years; and so on. For instance, if it is to be a short campaign against Asiatics, then the hitherto followed procedure, which has always given excellent results in our Indian wars, will do so again; an extra contingent of British Officers will not be necessary; arrangements for a regular supply of recruits and horses to replace casualties from time to time will not be needed; and so on with a host of matters which might be mentioned. But the organization must be on very different lines if the Foe is a formidable European Power.

We will suppose the war to be against a European Power beyond our N.-W. Frontier, with the likelihood of its being a protracted business. Such is the most important service Native Cavalry are likely to be employed on, and it is one in which the preparations will need to be thorough, and in which various contingencies will have to be provided for.

A scheme for mobilisation has been worked out, and the details for carrying it into effect have been duly arranged for, so that there should be no hitch when the occasion arises. It is evident the Cavalry branch of the Service should be amongst the first arrivals at the appointed rendezvous, as they will be the first required to push forward in the direction of the enemy; and it will be necessary to allow Regiments, that have been conveyed by rail from a distance, a few days' rest for their horses to recover from the journey. Three days in a railway wagon knocks up horses to a greater extent than is generally imagined.

Each Brigade on Service would consist of one British and two Native Regiments—a very suitable proportion. The latter would, of course, perform all the duties of Light Cavalry, whilst the British Regiment would act the part of Heavy Cavalry and give the Brigade solidity. The addition of Horse Artillery and machine guns would provide an effective power of fire. Great things are expected of these machine guns, but they have not been through the test of active service yet. Each Native Cavalry Regiment at the front should have the full strength of three Squadrons, or 468 Native Ranks all told, plus British Officers.

Organisation of an efficient Regimental Depôt.—A whole Squadron should be left at the Regimental Depôt under a selected Squadron Commander with a Squadron Officer to assist him. This Squadron should contain selected Rough-Riders, Drill Instructors, and Pay Duffadars, &c., to carry out the training of recruits and remounts, and the monthly adjustments of accounts, pay, &c., and it would be necessary to take immediate steps to bring up the strength of the Depôt to two Squadrons. Such a Depôt would be able to keep up the strength of the Service Squadrons by sending drafts to the front from time to time as required; and at the same time it would be capable of mustering a formidable number of sabres to quell local disturbances, should any be created by the disaffected. When Regiments go on service and leave empty quarters behind, the most extravagant stories get abroad in the bazaars, as we have so frequently heard in recent years; and the evil-disposed are then on the *qui vive* for opportunities to suit their purposes; whilst on the other hand, if a sufficient number of troops are left behind, and these added to by recruiting, the Military bustle would impress those disposed to mischief and keep all classes in awe.

Another advantage in leaving a full Squadron behind is that the Service Squadrons can be made up of picked men and horses, whilst the men in any way feeble, and unsound horses are capable of doing the Depôt work very well. This arrangement would furnish a steady supply of trained men and horses to replace casualties at the front and men returned to the Depôt for sickness; and there would be adequate provision for the preparation of drafts to replace losses, which a serious and protracted war would incur.

Records and accounts.—All records, books, accounts, muster rolls, &c., and correspondence relating thereto should be with the Depôt. They could not be kept on Service.

The Head Quarters of a Regiment on Service should send monthly statements to the Depôt of all changes, casualties, promotions, and monies drawn from Field Treasuries, with detailed lists of distribution, and from these data the Pay and Regimental accounts would be made up monthly at the Depôt, and the men's balances of pay kept in deposit or paid to their families as desired. There need be no vast accumulation of unadjusted accounts to be cleared up after the war is over.

The Bengal Cavalry system of keeping Regimental accounts is so copious and complicated that the Superintending Officer in charge of accounts is obliged to have clerks to do the work; and it could not exist under the strain of active service. This is not satisfactory. It would be beneficial if a Committee of Officers of Native Cavalry were appointed to look into the several methods in vogue in India, and select the system that will give all the information necessary regarding a Regiment's accounts, and that is at the same time most simple to keep. The ordinary Journal and Ledger, with a properly selected Heads of Accounts, can furnish all the requisite information regarding the state of a Regiment's money matters; and a supplementary account would deal with the settlement of unadjusted advances and deposits. All this may be done without labour by the Superintending Officer unassisted by clerks. These accounts should be kept in the Vernacular as well as in English.

Food supply.—The feeding of Native Troops is a simple matter compared with supplying the miscellaneous articles needed to satisfy the wants of British troops. But simple as the former is, yet on Service difficulty is experienced in keeping the simple articles, flour and ghee, in a wholesome condition. The flour gets mildewed and the ghee turns rancid, and the consequence is the health of the troops suffers. Good ghee well kept should not turn rancid. Flour, that has been kept some time in a damp climate, will turn mildewed notwithstanding all care. The only safeguard is to have the flour stored in air-tight tin cases like kerosine oil tins. The invention of a portable flour machine that would grind a sufficient quantity of wheat daily would simplify matters greatly, as the grain could then be fresh ground and issued as required.

One great source of worry and confusion connected with Active Service, is the settlement of ration accounts. On Service rations should always be issued free, or if this be considered too liberal, then it may be reduced by making a fixed deduction of Rs. 4, 6 or 8, a month from the Sowar's pay in lieu of a free ration for man and horse. This would simplify accounts, and it would be preferable to compensating men on service by the system of giving *batta*, where a man who has been across the Frontier a few days draws as much as another who has been a protracted time. Native Officers should be given rather a superior ration to what has been the custom heretofore. They are accustomed to live pretty well, and therefore feel the loss of their usual little luxuries such as tea, sugar, &c, which are not allowed in their Service ration.

The Russians give a considerable increase of pay to Regiments on Active Service, and this serves as a great stimulus to seek employment in war. Free rations are given at all times in peace and war, as the pay is so small.

The leading Military Powers in Europe have recognised the advantages of having some form of concentrated food for the use of armies in the field; and various preparations have been tried with the view of obtaining a wholesome food that combines portability with nourishing and sustaining virtues. The Germans have obtained satisfactory results in this direction. A similar form of food is much needed for the Indian Army, and this question should be entrusted to a competent Committee for solution. Native Cavalry on Service will be frequently required to perform forced marches for two and three days in succession, through a poor or barren country, with little or no allowance of baggage and supplies; and under such circumstances some form of concentrated food, to be carried by the Sowar, becomes invaluable and absolutely necessary. Caste prejudices will have to be considered in this matter; and probably some compound of sugar and butter will be found that will supply the want. We have an excellent concentrated food for horses in Goode's Forage, manufactured in India. It is the best for Active Service, being portable and nutritious.

Camp Followers.—Native Cavalry, in common with all branches of the Army in India, have an excess of camp followers to administer to their personal comforts. There is no harm in this in cantonments but it would be preposterous to attempt to take such establishments on Service. In the last Afghan War there were far too many followers. The regulations now lay down on a very liberal scale what each regiment is allowed to take on Service, and these limits should not be ignored with impunity. An example must be set, from the highest through all grades to the lowest, to dispense with comforts that the regulations do not sanction.

Professional cooks, *bhisties*, &c., are more satisfactory than trained soldiers for such duties; the former do the work better and more expeditiously, being more experienced, and the latter are thereby relieved from harassing work they are not accustomed to, and can the better perform their military duties. The armies of Europe boast of having very few camp followers, soldiers doing the necessary work; but this is a doubtful blessing, when badly baked bread and poor cooking are conducive to swelling the hospital lists.

All Regiments should have at least a dozen Pathans or Afghans in the ranks, as they are invaluable when campaigning in Afghanistan, from their knowledge of the language and the manners and customs of the people. In the late Afghan War, Sowars of these classes frequently went off alone and gathered information and supplies from distant villages, where it would have been certain death for any other class of individual to venture.

It is reasonable to suppose that an enemy, advancing against India from the Afghanistan direction, would employ selected troops for the work, the best that could be spared from its other frontiers, and in as great numbers as it was possible to provide with all the requisites of food-supply and munitions of war on the scale needed by modern armies. Gigantic modern armies cannot operate in a barren country at a distance from their base, without railway or water transport. We know the amount of transport that was needed in the Kabul-Kandahar march for a flying column, 10,000 strong, at the time of year when the valleys passed through provided abundant forage, and no enemy opposed the advance. We also know the numbers and the fate of the camels the small Russian force required in the Khiva Campaign. Consider the greater distance an enemy would have to advance to India, the destitute nature of the country, the necessity of obtaining all supplies from the base, and the amount of transport that would be necessary for an army of moderate strength, and the impression conveyed to one's mind is, that the difficulties will be found very great indeed even for an unopposed advance, and that there would be no rations to spare for useless mouths.

It is very doubtful whether wheeled transpart could be used by an enemy operating through Afghanistan against our N.-W. Frontier; of course, the ability to do so would make a material difference. It is probable that if wheeled transport could be used at all it would be so only on limited portions of the way, and the necessary supplies would have to be conveyed on pack animals most of the journey. In any case no overwhelming force could threaten our N.-W. Frontier except the enemy had a railway within easy distance to bring forward supplies. And we may rest assured that the force we are able to put in the field, under the conditions as they stand at present, will be ample for all requirements; and that the Native Cavalry will have an opportunity of being employed in fair fight, and not be overwhelmed by numbers.

The influence of modern small-arms.—The importance of small-arms fire has taken a prominent position of late in our army, and the principles advocated in Mayne's "Fire Tactics" are being applied in the instruction of those concerned. And since the Cavalry have been armed with improved breech-loaders, the idea of employing them dismounted to bring a rifle fire to bear in the defence of important positions has been practised, and their value in such situations is recognised; at the same time their training as Cavalry has not been neglected or modified, the only change has been that the use of the carbine is now more fully recognised as an auxiliary. It would seem most of the European powers hold the same view as we do regarding the importance to be attached to the use of Cavalry as dismounted dragoons, and the circumstances under which it should be so employed.

The Russians, however, have taken a different view of the case, more in accordance with the experiences of the American Civil War of 1862-64. Great changes have been effected in the Russian Army since their last war with Turkey, and these changes are said to be the outcome of experiences gained in that war. It is not apparent, however, that the Russians had any opportunity during that war of forming a decided opinion on the merits of their Cavalry as Cavalry proper and as Mounted Rifles. Anyhow, the Russian Cavalry of the line at the present day have been transformed into a force of Mounted Rifles. They are taught to use dismounted fire on every possible occasion; the Berdan Rifle is looked upon as their special arm, and it is provided with a bayonet; whilst on the other hand, although they carry swords, this is more as a badge of office, they attach little importance to its offensive powers, and they have very little instruction in its use. How this method will fare on Service is a very interesting question; it is a complete departure from the recognised rules of centuries, and the established opinion of the military world, and it is a bold experiment that the Russians are making. In the American Civil War, the wooded nature of the country, and the previous training of the men favoured their being employed as Mounted Rifles; and as such they did excellent service: but at no time were they opposed to genuine Cavalry, and the experiences obtained from this war are far from being conclusive.

In the pre-supposed struggle on Afghan soil, the Cavalry of both sides will of course be pushed well to the front, and the campaign will commence with Cavalry actions between the advanced forces, which actions will terminate with one side obtaining the ascendancy: the weaker Cavalry will have to retire within the bounds of its Army for support, whilst the stronger will have sway over the whole country around, and will then have acquired the first solid advantage towards ensuring ultimate success. These preliminary fights will of necessity be of the nature of Cavalry combats for the establishment of an ascendancy; they will be consequent on rapid and aggressive movements, and will not result from the occupation of particular strong positions pending the arrival of Infantry, for there are few such strategical points of special importance in the supposed sphere of action between Kandahar and Herat. In these combats, therefore, the country generally being of an open nature, suited for the manœuvring of Cavalry, the dismounted fire of Dragoons will act a minor part, the main issue will be decided by cold steel, and that force which is best qualified by its preliminary training for arbitration at close quarters, will remain victors on the field.

In contests where the Cavalry have been sent forward to seize and hold a strong position until the arrival of Infantry, there will always be great danger of being surrounded and having retreat cut off in a country of an open nature, when the opposing Cavalry is master on the plains through the aggressive power of cold steel rather than the defensive power of carbines. It is an axiom which does not require demonstration that the aggressive power of Dismounted Rifles is small in proportion to the force of the material. The necessity of leaving the horses some distance in the rear out of range, and with a sufficient escort to protect them from a sudden swoop down of Cavalry, must weaken the attacking line of Dismounted Rifles very considerably by dividing their forces.

The new small-bore magazine rifle which has now come into favour, and is about to be issued to the armies of Europe, will introduce a new factor bearing on the question of the offensive power of Cavalry in the battle-field against Infantry fire. It has been found on trial that the new rifle does not inflict so severe a wound as the Martini or Snider, and that it is not considered sufficiently deadly to stop a horse in the charge, unless he is struck in the heart or brain. In future [illegible] when the new rifle has been fully introduced, we may expect to [illegible] Cavalry more frequently and successfully employed in the attack against hostile Infantry in the field of battle.

One feature in the action of Cavalry that has not yet undergone the test of trial on service, is the converging attack by Squadrons advancing over the dangerous zone of fire by extended files. There is reason to expect that this method of attack will accomplish startling successes where employed under favourable circumstances, such, for instance, as when a position in an open country is taken up by the adversary's Infantry or Dismounted Cavalry, and they have not had the time or means to throw up obstacles to the free advance and attack of Cavalry. The inference to be drawn from these observations is that in open country suited for the action of Cavalry, *cœteris paribus*, this Arm cannot be confronted successfully by Mounted Rifles;

Conclusion.—Giving due weight to the various considerations here noted, the general deduction to be drawn is, that the Native Cavalry are a well horsed and well equipped body of men, their training is carried out on proper lines, but whilst undue importance is not attached to small arms fire, yet sufficient attention is not paid to Loose-practice with sword and lance; their interior economy is very good; and they are specially adapted for performing the duties of Light Cavalry campaigning in a naked country with poor resources; and there is every reason to expect that in our future wars, a large field will be opened to them to exercise their several good qualities, which have been further developed by their special military training. And in conclusion it has to be stated that Native Cavalry, recruited from the martial races of India, as well instructed in the use of the sword and lance as they were in the beginning of this century, and led by a sufficiency of British Officers whom they know and have faith in, will not fail to render excellent service when employed on active service against a formidable European Power, and they will prove themselves worthy to attack in line with the British Cavalry against any foe.

taught to use dis-
Rifle is

THIRD ESSAY.

By Lieutenant W. W. Norman,

2nd Punjab Cavalry.

"Is it better with the many to follow a beaten track?"
TUPPER.

The rise of the Native Cavalry.

When in the stirring times of the Sikh wars and the Mutiny, regiments of irregular horse were first raised, they were composed of men who had been accustomed to see war in some form or other, to ride and to use weapons; in many instances the native officers and troopers were men who had fought against us but, on being conquered, acknowledged our superiority and readily took service in our army. Regiments were raised not in times of peace but in time of war, when their services were urgently required; there was but little time to train and drill, and in sooth this was not much required, for the reason that our enemies possessed neither training nor drill; and so far both sides were equal, our irregular horse and those of the enemy; the men too were pretty well of the same stamp though at times of different races.

Victory was obtained by the good leading and tactical handling of young and dashing British officers and by the trust their men placed in them. After the Mutiny those of the old leaders who remained knew that peace was pretty well assured for many years to come; the necessity for increased efficiency did not make itself felt and all were content to let the cavalry remain practically untrained. This was all very well for a few years, but then the old troopers began to leave, their places being filled by youths who, though of the good old stock, were still unacquainted with the use of weapons, and gradually too as the former fighting classes settled down to agricultural pursuits, the taste for breeding and keeping horses became diminished, and thus to a great extent recruits were enlisted who could not even ride. These changes, however, were not realized, and thus by degrees the semblance of the old irregular cavalry alone remained, and the name losing its true meaning became synonymous with untrained men and horses. Not only this but regiments had to contend against what was far worse. I allude to what has aptly been called the system of "commanding officers regiments," for in the majority of regiments the Colonel considered that he alone of all his officers was capable of training the men he had raised and led. On his retirement his line of action was adopted by his successor and seldom or never did they delegate powers of instruction or command to their subordinates, and so it happened that squadron commanders and squadron officers became absolute nonentities; it was almost akin to an insult to the Colonel for one of the latter to show any interest in his men or to walk down his troop lines. The enlistment of recruits, disposal of horses, and promotion of non-commissioned officers were made by the Colonel without in many cases the slightest deference to the squadron commander's wishes. Within the last few years endeavours have been made with marked success to improve this state of things, but much more remains to be done.

A Cavalry school for British Officers.

The many and varied duties which cavalry has to perform render it necessary that its officers and men should receive a very high training. In the native cavalry where British officers are so few in numbers it becomes essential that they should receive the most perfect training prior to joining their regiments. I would suggest therefore that the present system of taking young officers from British infantry regiments should be discontinued. The disadvantages of this system are many and apparent; it is hardly necessary to narrate them all, but the result is that after a service of about three years spent perhaps wholly with a British infantry regiment, or, as is often the case, partly with it and partly with a native infantry regiment, a young officer is appointed as probationer to a native cavalry regiment, and he has then to pass a course of equitation and the higher standard in Hindustani, and thus another year is passed. Hence only after a service of about four years is he able to join his regiment and settle down to learn his work as a cavalry soldier, and it is not until another year has elapsed that he becomes capable of taking part in the instruction of his men. Such a system is manifestly unfair to the young officer, for during a period when he should have been learning his work, he has been made to serve the greater part of it with an arm of the service in which he took no interest, and owing to the lack of which he was practically a useless officer. *Time spent in this manner is time lost.* I would therefore propose that for the system outlined above the following be substituted.

At Aldershot a school of cavalry to be formed for the instruction of such cadets from Sandhurst, who may after having passed their final examinations for commissions, desire to enter the native cavalry. All such cadets on passing out of the R. M. College to be gazetted officers in H. M. Land Forces and to receive English pay as cavalry subalterns. Horses, saddlery, and other requisites to be supplied by Government on a system similar to the horse Chunda in the native cavalry; officers being called on to deposit a sum on joining the school and to pay a small monthly subscription. The school to be presided over by an officer of the native cavalry who is in possession of the Staff College certificate, he to be assisted by a competent staff. The course of instruction to embrace all contained in the cavalry regulations, certain selected books bearing on the training and use of cavalry, veterinary science, shoeing horses, equitation, fencing, and mounted combat. Every opportunity should be taken to employ the young officers during manœuvres and at camps of exercise. Uniform to be of the simplest and limited to that actually necessary for the performance of the various duties. When it is taken into consideration that a young officer has to get full infantry uniform and live in a British regiment on small pay, and that despite his best efforts he cannot help joining the Staff Corps in debt, then from a pecuniary point of view his parents will welcome the institution of the above scheme, and gladly pay the entrance subscription which would be returned, and the monthly which would not.

The above is but a rough outline showing the principle on which the school should be formed. I do not think that much extra expense would be incurred, for to a great extent the school would be self supporting. The advantages would be at once felt throughout the service. British regiments would not be encumbered with a number of useless subalterns, and the young officers would, after a course of instruction lasting for about a year, join the native cavalry with a thorough knowledge of their duties, and it would but remain for them to learn the native languages in order to be able to impart instruction.

School for Native Ranks.

With respect to the native commissioned ranks, there can be no doubt that the general opinion of Staff Corps officers is that we want a much higher class of men to fill these ranks now than was necessary formerly; this is seen daily in every increased detail of work. Without in any way trying to disparage the good qualities of our present class of native officer we must bear in mind that the art of war is progressive, that each succeeding campaign makes greater calls on the qualities physical moral and intellectual of the combatants. Throughout the British service this principle has been grasped, and all ranks, officers and non-commissioned officers, have to devote themselves much more than they did formerly to a study of their profession. The State itself takes measures that they shall do so, by the formation of schools and courses of instruction, and by the imposition of obligatory examinations, which all must pass or take the consequences of failure by loss of promotion. It seems then most extraordinary that, while measures are taken to ensure a high standard of efficiency throughout the service, the native commissioned and non-commissioned ranks should alone be exempt, yet while being exempt they are still expected to perform duties which it is admitted by all require constant study and thought for their efficient performance.

In the case of war with a European Power we should require a very different stamp of native officer to those serving us now. It must be borne in mind that we should in all probability have to contend against superior numbers, and we must therefore make up for the disparity of numbers by the efficiency of the individual. It is the boast of the native cavalry to call itself "irregular," but the disuse of this term would be greatly conducive to increased efficiency. We can claim no exemption in the way of training, on the contrary it should be carried to the very highest possible pitch, and to obtain the maximum efficiency we must have better educated native officers and non-commissioned officers. With the idea then of procuring a superior class of native officers and non-commissioned officers, men who of their own free will read and think, who will endeavour to instruct and supervise, instead of being instructed and supervised, I propose that at some central station such as Amballa or Rawal Pindi a permanent school of instruction be established for native officers, non-commissioned officers, and men on the following lines.

(*a.*) Each regiment to furnish yearly a detachment of one native officer, two non-commissioned officers, and two men. The non-commissioned officers and men to be selected from among those men who it is considered will in all probability rise to the commissioned and non-commissioned ranks respectively.

(*b.*) All selected men to be able to read and write Urdu fluently, and to have a knowledge of arithmetic.

(*c.*) All men to take with them their horses, ponies, syces, arms, and accoutrements.

(*d.*) The course of instruction to be as practical as possible, but to embrace a certain amount of book work in such subjects as fortification, surveying, military history, tactics, veterinary science, shoeing horses, and all contained in the cavalry regulations.

I am aware that there are not at present any books in the vernacular on such subjects as military history and tactics, but it ought not to be difficult to publish a work written in a simple narrative style. Such a book should be freely interspersed with ancedotes of personal exploits showing presence of mind, readiness of resource &c. It would not be necessary to illustrate great battles but a collection should be made of small isolated actions, which teach in themselves with just as much clearness as do great battles, all the main principles which govern the employment of cavalry, such as handling a reserve or support, flank attacks, cohesion, folly of pushing a pursuit too far *i. e.* of getting out of hand, dismounted combat &c., &c. All examples should be taken from Indian campaigns, and every endeavour should be made to promote a feeling of ambition by the insertion in these books of the names of native officers and men who have in former times distinguished themselves. A knowledge of map reading and surveying is essential to the proper performance of reconnaissance, and such an amount of fortification should be taught as might come in useful for cavalry acting as a rear guard or on out-post duty, *viz.*—the construction of obstacles, and fortification of a small village or post on a road.

Powers of Squadron Commanders

The independence of action which characterizes cavalry demands a very close bond of union between officers and men; in order therefore that this bond may be ever present in time of war it is necessary that, during peace, the officer commanding a squadron should have absolute control over it in all that relates to its efficiency and instruction. During the last few years, the position of officers commanding squadrons towards their men has been slightly improved; certain concessions have been made but they are comparatively trivial. There is a proneness to interfere with the interior working of squadrons, the result being that squadron commanders consider themselves hampered and do not display that amount of zeal which they otherwise would. The first step towards improving this state of things was the introduction of squadron training, and it is well known that by this means the efficiency of regiments has been greatly increased. Squadron training has been a success, why limit it to a few paltry weeks in the year? Let us go the whole hog, and have it the whole year round; substituting in its place Troop Training under troop commanders.

Perfect steadiness in the manœuvring of a regiment is not to be obtained as many think by daily regimental parades, it is only possible when each squadron has been taught to drill steadily by itself, under the direction of its own officers. There should not be more than one regimental parade a week, the other four days excluding a holiday should be given up to squadron commanders for their squadrons, the idea for each parade originating from the latter, who should know best what particular points require to be worked up. Establish this system of squadron training the whole year round, and in the very first year of its trial the efficiency of the native cavalry will be enormously increased; of this there can be no doubt, absolutely none, just as there is none concerning the fact that unsteadiness in manœuvre is largely due to a preponderance of regimental parades.

Many points connected with the interior economy of squadrons might with advantage be left to be dealt with by squadron commanders, a few of the most important being the selection of recruits and promotion of non-commissioned officers.

With reference to the first of these I would urge that no recruits should come to head-quarters for approval, but that squadron commanders should be sent every now and then on recruiting duty into those districts from which the recruits for their squadrons are procured. In this manner officers would get to know much more about their men than is possible when recruits come to head-quarters for approval. Further an officer would feel a greater interest in a man whom he had himself chosen, and the latter would on his side work up better for the officer who had selected him; thus a mutual bond would be formed which would render the task of instruction and receiving instruction a pleasure to both officers and men.

As regards the promotion of non-commissioned officers it should to a great extent lie in the hands of squadron commanders, men should be taught to consider that the reward of good service is in his gift; there can be little doubt that the best man will be selected by him, who is most responsible for the efficiency of the squadron, and who most has its interest at heart. Final acceptance of a recruit and sanction of promotion should of course rest with the commanding officer, but first selection should be made by the squadron commander.

Caste Composition of Squadrons.

Political reasons rule, that the majority of regiments shall be composed of mixed races, but as far as is compatible with the above requirements this system should be limited. The fact of having several different races in a regiment requires that each of these races shall be represented by a certain proportion of commissioned and non-commissioned officers, and since the more varied the races the fewer are the numbers of each race, it necessarily occurs that the selection of men to fill the commissioned and non-commissioned ranks becomes very limited; thus men are often promoted who are in reality unfit for it, and would not ordinarily be selected, but nothing else remains and the best is made of a bad bargain. The squadron is practically the unit in native cavalry, its two troops should invariably be of the same race and religion with kindred feeling, and ideas; promotion would then run in the squadron and not in the troop, thus the field of selection would be enlarged and consequently better men promoted. Again great inconvenience is caused owing to differences in eating and drinking. Such should not be the case, every man should be able to eat and drink the same food and out of the same vessel as the others, detached duties would then be performed with much greater comfort and consequently greater efficiency.

An essential to success during a fight or any other undertaking is the co-operation of those engaged, and an essential to co-operation is, that each man shall have perfect reliance in his comrade. This cannot exist to its fullest extent, when men are of different races, with different manners and customs, who only meet together to perform a duty and do not fraternize when it is over. It may be necessary as I have said above, that for political reasons the squadrons of a regiment should be of different races, but each squadron should be in itself a corporate body, consisting of one race.

Proposal to raise a 5th or depot squadron.

The strength of a regiment is 625 sabres, but on the outbreak of hostilities, a depot has to be formed for the reception of untrained recruits and horses, sick men and horses, and men who are medically unfit for service; further a certain number of efficients have to be kept behind for the purpose of instruction and interior economy, thus a considerable reduction is made in the above numbers, causing the incongruity that the war strength is less than the peace strength. It is necessary that a war strength should be laid down and measures taken to insure that, no matter what the demands of active service may be, the war strength shall remain constant. Hence arises the necessity for a reserve, on which subject I propose to say something later on, but first I would urge that the nucleus of a reserve should be ever present and attached to each regiment: it should consist of a 5th or depot squadron with a peace strength of 78 sabres and composed as follows.

Combatant.	1	Ressaidar, the woordi major	Mounted.
	1	Duffadar, senior drill instructor	
	1	Pay Sowar, a drill instructor	
	19	Drill instructors and rough riders	
	51	Recruits dismounted, at Rs. 10 per month	
Non-combatant.	1	Hospital Dresser	Mounted.
	1	Salutri	
	1	Assistant Salutri	
	1	Armorer	
	1	Assistant Armorer	

30 Horses.

Total Strength. Combatants 73, Non-Combatants 5, Horses 52.

A few remarks are necessary to show the reasons for the above composition.

All drafts whether of men or horses, sent to join their regiments on service, must be fully trained, thus a certain proportion of drill instructors will be required to train recruits and a certain number of rough riders to train horses. The yearly average number of recruits under training in a regiment is about 30; in order, however, that vacancies in the service squadrons may be readily filled up, there should always be on hand a certain number of thoroughly trained recruits, who might for purposes of parade be mounted on furlough or sick men's horses. Salutris and Armorers are practically non-combatants and the hospital dresser most decidedly so, this being the case they should not form part of the service squadrons, although they would accompany their regiments on service. For the purpose of instructing recruits in equitation about 30 horses would be required, those recruits not receiving mounted instruction being engaged in foot drill, gymnastics, musketry etc.

This squadron would be commanded by the adjutant and in the same way that squadron commanders should have perfect control over and be responsible for the efficiency of their squadrons, so should similar powers be given to the adjutant over the depot squadron, *i. e.* over his recruits; such is very far from being the case at present, for owing to the custom of having daily parades under the officer commanding, the adjutant, and not only he but his assistant the woordi major seldom see their recruits, who are left to the tender mercies of the drill instructors, and consequently do not get the training that they should.

This squadron or rather nucleus of a squadron would be at once a reserve and a training school, producing the following advantages:—

(*a*). Each service squadron would always remain at its full strength, with every individual composing it efficient and available for duty in its ranks. Its numbers would not be reduced by having on its rolls drill instructors employed in instruction, untrained recruits, and non-combatants.

(*b*). On mobilization for active service men in hospital and old sowars unfit for further service would be transferred to it, their places being taken by the best trained recruits, who would take over the horses and accoutrements of the former, (and receive mounted pay.)

With advantage recruits might be enlisted at an earlier age than is now allowed, as it would then be easier to train and instruct them. Under any circumstances recruits would be longer under training and consequently better fitted to take their places in the ranks on a vacancy occurring in the service squadrons.

Lastly the nucleus of a reserve being thus permanently attached to a regiment it would only remain for orders to be issued on mobilization, as to what strength the depot squadron should be raised.

Formation of Reserves.

The necessity for a reserve wherewith to supply regiments on active service, with the necessary amount of men and horses to keep it up to its full strength is at once apparent and pressing. It goes without saying that any scheme which provides for the above must necessarily entail increased military expenditure; the problem to be faced is how to provide an efficient reserve at a minimum cost.

Colonel F. Lance, C. B., late Commanding 2nd Punjab Cavalry, has proposed a scheme for the formation of a reserve of men which has, I believe, been already submitted to the military authorities. In it he advocates the entertainment of two men under the same assami, each to serve during alternate years. I do not think that it is possible to carry out his ideas in their entirety, but a modification of them seems to offer the best solution of the problem of obtaining a reserve.

I would propose that no one should be allowed to pass into the reserve before completing 15 years service, and that all men on attaining that amount of service should be given the option of continuing to serve with the regiment, or joining the reserve. Periodically the transfer of men to the reserve might be suspended or a limit placed on the numbers to be transferred. Every two men who elect to join the reserve would be associated with each other as "reserve joriwals;" they would each receive back half of their assami, and one be retained to serve with the regiment for one year, the other proceeding to his home, each replacing the other every alternate year, for a term of 10 years, when both would be transferred to the pension establishment. In order to ensure that reservists were at all times fit for active service, it would be necessary to have them yearly examined by medical committees. The pay of a reservist while with the regiment to be the same as that received by the other sowars, but while at his home he should receive Rs. 6 per month. The amount of pension on the completion of 15 years continuous service with the regiment, and five years put in with the regiment as a reservist, would be the same as now paid on the completion of 21 years service *viz.*—Rs. 4.

The horse, saddlery, accoutrements, line gear, and stable necessaries of a pair of reservists would be common property, but each man would keep up separate uniform, which would be stored at regimental head-quarters. The great coat and poshteen might be common property. In the event of a war the State should advance as a loan to each reservist that amount of money necessary to enable him to pay up his full assami.

It is of course impossible to say what number of reservists could be obtained from the above scheme, trial could alone decide, but I am convinced that the idea would be popular on mobilization. Reservists not present with the regiment would be summoned from their homes and attached to the depot squadron. Yearly, however, as they came up, they would undergo a month's training under a selected officer before being allowed to drill with their squadrons.

In framing a scheme for a reserve of men we have only one difficulty to contend with, this being the cost. The men are available, whereas any scheme which provides a reserve of horses must be based not only on the cost but on the production of animals, which exist in but limited numbers; hence it follows that horse breeding becomes the primary consideration. It is impossible to expect that the State can ever afford to keep up an actual reserve of horses during time of peace, the question to be faced is how to procure an abundant and ever ready supply of horses of a good stamp. The treatment of this subject can best be left to the horse breeding department.

Increase of the Sowar's pay.

The soldiers of the native army are purely mercenary, we cannot expect them to go into battle and fight for British interests with the same feelings of loyalty which actuate British soldiers, there must be essentially "cupboard love," and to keep the cupboard full should be our motto. It is necessary therefore that we should look to their interests and see that, not only are they not losers by performing our service, but that they are gainers and content.

In the days when a sowar's pay was fixed at Rs. 27 per month, provisions and forage were exceedingly cheap, and the sowar was content because he could save at least Rs. 7 per month to send home, after having fed himself and his horse and having paid all regimental deductions. In those days to be in the army was a lucrative business, men who had money enlisted, feeling that they would get good interest on their assamies, and those who had none borrowed it, knowing full well that, from the good balance which would accrue to them at the end of each month, they would be able to at once pay the village shroff his monthly instalment and yet have a few rupees for themselves.

Many things have combined to banish those halcyon days for the sowars, not only have the prices of provisions and forage increased considerably, but the State demands a greater amount of efficiency now than it did formerly, and this has entailed more efficient and therefore more expensive equipment and accoutrements. Camps of exercise, carbine clubs, &c., &c., all help to drain the sowar's pocket. Thus with the decrease of its profitableness the fascination for a soldier's life is passing away; this is seen by the difficulty now experienced in getting recruits, and those that come are not of the good old stamp.

Another point has to be considered which has a very strong deterrent effect on enlisting, and this is that, whereas in former days the field for the employment of natives was comparatively very limited, and service in the native cavalry among the most remunerative employments to be had, now-a-days the field is very much enlarged, embracing service in far better paid posts, such as the Hong Kong, Singapore, Burmah Police and numerous civil appointments.

In former days, it was pretty well understood that a sowar could make money over his horse allowance of Rs. 13-8, and as a rule the cost of feeding a horse, including pay of a syce, was well under that amount. Now, however, it is the rule and not the exception that it shall exceed Rs. 13-8. It is a mistake to suppose Government invariably grants compensation when the cost of forage exceeds the above amount as this is not always the case. The rules which regulate the grant of compensation require that a no-grass certificate be submitted in support of charges. Now it often happens that grass is obtainable, but of such an inferior quality that the horses will not eat it, and the men have in addition to paying for the pony's feed and syce's pay, to buy fodder from zemindars, and compensation is not drawn because grass was obtainable. In many other ways does it occur that the sowar is out of pocket over his horse allowance.

Looking then at the facts as they stand, viz., increased expenditure in food, forage, and equipment, and in less pecuniary attraction as compared with other services, it is necessary that an alteration be made in the sowar's pay. It is no exaggeration to say that during the last 10 or 15 years the amount of the assami has increased at least 20 per cent. and the price of food and provisions almost 50 per cent., and thus a corresponding increase should be made in the sowar's pay to enable him to live with ease and comfort, and to make service in the native cavalry popular. This increase should not be less than Rs. 5 per month making a total of Rs. 32 per month. On this rate of pay no compensation for either dearness of provisions or forage should ever be allowed.

It must not be considered, that because the sowar's pay is increased, he must therefore be prepared to expend more on his equipment. Expenditure on this head has already been carried quite far enough. I do not advocate inefficient equipment and accoutrements, but consider that, in fairness to the sowar, the arrangements now followed with reference to the purchase, change, renewal and adoption of equipment should be considerably modified, and this can be done without any detriment to efficiency. The fact of regiments having different equipment and accoutrements cannot tend to the cheapness of those articles, neither can the fact that the articles are allowed to be purchased from any petty firm at will. It stands to reason that the more varied the articles and the more distributed the patronage, the less competition will there be in the supply of those articles, and the less reduction in their prices.

Justice to the sowar and the efficiency of the native cavalry demands that universal equipment and accoutrements be adopted; that the monopoly of supplying the above be given to three or four firms, it being left to the discretion of commanding officers which firm is to be patronize; and that the sanction of general officers commanding shall be obtained for the purchase of all new equipment.

The necessity of a universal pattern of equipment.

In advising a universal pattern of equipment and accoutrements utility should alone be looked to, and every article discarded, the only recommendation of which lies in the fact that it looks nice, as for instance the pouch belt which is absolutely useless for the purpose of carrying ammunition. I would advise then that a committee be assembled at Simla, to thoroughly consider this question, and that suggestions be called for from officers of native cavalry who may interest themselves in this subject, and patterns of equipment and accoutrements be sent for inspection; *par parenthèse* I would mention that a great deal of saving to the sowars' pockets might be made by allowing them to appear on parade in the hot weather and at times in the cold weather in white native clothing, thus to a great extent saving their khaki and serge uniforms from wear and tear. A colored serge and khaki serge blouse would suffice in the way of uniform, native clothing of an authorized pattern being worn on such occasions as riding school, target practice, and on all foot parades for instruction.

It has been proposed by some of those who recommend the increased rate of Rs. 5 per mensem to the sowar's pay, that he be called on to subscribe to an equipment fund, but I consider that this would be wrong on principle; there should never be any fund ready that offers the temptation to order new equipment. Articles should be renewed only when absolutely necessary and after they had served the full term of duration. On the other hand, while keeping a check on extravagance, care must be taken not to retain equipment until it becomes old and inefficient.

Certain funds have, however, a claim on the extra allowance, notably the Chunda, and instead of Rs. 200 being the entrance subscription so to speak, it should be Rs 250; similarly the monthly subscription should be raised from Rs. 2 to Rs. 2-8.

It has been said above that consequent on the increased rate of pay, the sowar should never be allowed compensation for dearness of provisions or of forage. but looking to the fact that the native is a thriftless being. I think that Colonel Campbell's (Guides) idea of a Provident Fund should be adopted. He advocates that each man should subscribe Re. 1 per month to this fund and that out of it they should receive aid when necessary to enable them to meet extraordinary cases of expenditure, such as for forage and provisions in times of scarcity, expenses of camps of exercise, loss of equipment by accident &c., &c.

Measures to be taken to popularize service in the Native Cavalry

By an increase of his present rate of pay we shall make the sowar contented, and by making his business lucrative instead of the reverse, we shall again cause service in the native cavalry to become as popular as of old, and thus draw into its ranks the very best classes. We cannot however content ourselves with ameliorating the condition of the soldiery at present in the ranks, we must still bear in mind that they are mercenaries, and being so we can only expect their loyal service so long as they understand that their interests are identical with the continuance of British rule. This leads us to the consideration of rewards for past service. It is impossible to expect that the state can give any further increase in the rates of pension, but it can add to the pension already given by reserving solely all its chuprassiships for deserving pensioners, and for men who though medically unfit for active service would still be able to perform the duties of a chuprassi. By doing this a great saving might be made in the pay of chuprassis, for it would not be necessary to give as much pay to a man already in receipt of other pay. The social position of the native soldiery would be greatly increased by such a step, for among natives, a man's dignity is measured by his propinquity to those in authority. These chuprassiships should only be given to pensioners on the distinct understanding, that in cases of mutiny, or other extreme cases of necessity, they would be called on to form a corps for the defence of Government buildings etc; and in order to keep up a certain amount of efficiency they should be armed with rifle and sword and called out for drill once or twice a month with volunteers.

Another step which would conduce greatly to popularizing service in the native cavalry would be to form the Viceroy's body-guard of specially selected men from the native cavalry; the fact of a man being a non-commissioned officer in the latter should be no bar to his being appointed a sowar in the former.

With respect to native officers their social position would be greatly increased by appointing a certain number of them as aide-de-camps to General Officers Commanding Divisions and Brigades, and even to Commissioners of Districts; this last would be a very great step towards attaining the desired object, for the dignity thus conferred would be brought prominently before the civil population; this aide-de-camp might well be the channel through whom native soldiers could address civil officers.

Employment in War.

Since the introduction of fire-arms the employment of cavalry in campaigns has undergone numerous and varied changes. At first when infantry fire was effective at the farthest up to a distance of 150 yards, cavalry was posted on the flanks of the line of battle, and its rôle was to charge repeatedly during the progress of the fight as it saw opportunity; success in a charge as often as not led to ultimate defeat, not only of the cavalry itself but of the rest of the army, for, as a rule, cavalry pushed its pursuit too far, and giving itself up to plunder was consequently not available at the critical moment. As time went by and the effectiveness of fire-arms became improved, it was seen that unbroken infantry could not be charged at haphazard as in the old days; cavalry was therefore massed in rear of the line of battle, in reserve for the critical moment, when the enemy began to waver and give way. It then sprang forward to convert a momentary repulse into defeat and rout, or, in case of the defeat of its own army, endeavoured by repeated charges to stem the pursuit and allow its army to retreat unmolested.

Until the American war of secession, the charge was considered to be the sole rôle of cavalry, and its action was limited to that of the actual battle field itself. The campaigns of the above war, however, opened up a new vista for the employment of cavalry, and showed that it had duties to perform, not only on the actual field of battle, but in the general strategy of the campaign itself. It was determined that the rôle of cavalry should not be restricted to the charge alone, but that, on the contrary, the great mobility of horsemen should be utilized at the very outset of the campaign, in advancing deep into the enemy's country, impeding and laying bare his mobilization, in destroying his arsenals and stores of supplies, and in breaking up his lines of communication; these were all offensive movements, and all new to modern warfare, though in a crude unsytematic form they were practised in ancient days and even in modern days by Asiatic armies. On the defensive, on the other hand, cavalry was employed to screen the movements of its own army, and at the same time to oppose offensive movements made by the enemy's cavalry to impede mobilization, and ascertain the position of the different troops composing it. Hence arose the system of reconnaissance, which is both offensive and defensive, and which was brought to such perfection by the Germans in the war with France in 1870. Apart from evolving the above duties, which are connected more especially with strategy than with tactics, cavalry burning with a desire to employ itself on the field of battle, and not being content to wait massed in rear of the line of battle, armed itself with a fire-arm, and adopting dismounted tactics, pushed ahead and brought the retreating enemy to bay, holding them until the infantry of its own side came up, when, remounting, it worked round the rear and flanks of the enemy, cutting off its retreat and supplies. In the same way it advanced to meet reinforcements arriving for the enemy, and by its dismounted action so delayed them that they arrived too late. Posts and positions on the lines of communication, and outposts were held and retained, which cavalry armed with the sabre alone would have been obliged to evacuate.

The adoption of fire-arms by the American cavalry was not, as many think, to the absolute exclusion of the sword. It is true that sabre charges were comparatively few, but many things combined to limit the uses of the sword and lance, chief among them being the fact that the lead in using cavalry on the lines I have stated above was taken by the South, and when the war broke out the South had no regular cavalry and no arsenals filled with swords and lances wherewith to arm the volunteer horse, who came with their horses, sporting rifles and pistols, determined to do the best with what weapons they had. Again the country where the fiercest fighting took place was as a rule unsuited to cavalry charges, it was generally covered with forests, marshes and swamps, the roads lined with deep wide ditches, broad rivers with numerous creeks were met with at every turn, and lastly the fighting was generally against well chosen and defended positions. Nevertheless endeavours were made to arm the volunteer horse with sword or lance, and when opportunity occurred and circumstances of ground permitted, charges of every conceivable description were made with the sabre, against cavalry, artillery, and infantry. These charges were made by men not reserved, as some think, simply for mounted action, but by men who had been fighting on foot for hours previous to the occurrence of the sabre charge, thus conclusively proving that a brave man will fight on foot as well as on horseback and deem himself invincible, either mounted or dismounted.

It is true that during the Franco-German war neither side adopted dismounted tactics for its cavalry, but the writings of Von Schmidt and Verdy du Vernois show that the Germans fully recognize their mistake in not having done so, and that they have every intention of adopting those tactics on a future occasion. The Russians to a certain extent used their cavalry dismounted during their last war with Turkey, and are so impressed with the importance of cavalry dismounted tactics that they have turned their cavalry more or less wholly into dragoons, according to the old meaning of the word; they have proceeded perhaps too far in this direction, by arming their cavalry with the rifle and bayonet, instead of with a carbine alone.

A summary of the above shows that the rôle of cavalry in future ampaigns consists of five main duties, *viz*:—

(1.) Offensive raids into the enemy's country to hamper mobilization and to locate the position of the different armies.
(2.) Measures taken to secure distant strategical points.
(3.) Offensive reconnaissance prior to combat to ascertain the composition and position of the troops about to be encountered.
(4.) Defensive measures taken to screen the movements and position of its own army from the enemy, and also to give it security from surprise.
(5.) Action on the field of battle in pursuit or retreat.

With reference to the first of these, the prompt seizure of the initiative is all important, therefore the instant that political discussions commence to take a hostile tone, that instant should cavalry be concentrated on the frontier, ready to advance into the enemy' country. In India, however, we should have to concern ourselves more with fulfilling the second condition, *i. e.* that of rapidly seizing distant points. To this end also should cavalry combined with artillery be rapidly concentrated. It would, however, be advisable to have permanent camps situated as near as possible to the frontier, at such places as Quetta, Dera Ismail Khan, and Peshawur; at each place there should be not less than a division of cavalry of three brigades, each of two regiments and to each brigade a battery of artillery.

The term reconnaissance as at present understood embraces both offensive and defensive duties, offensive in that cavalry has to search for the enemy, defensive in that, while searching, it has to screen its own army, in order that its movements may be concealed from the enemy's cavalry. These double duties would appear to be incompatible, the latter only hampers the efficient fulfilment of the former. To obtain knowledge of the enemy's whereabouts cavalry must push far ahead, right into the enemy's lines, while to screen its own army it must remain comparatively close to it.

In the struggle to perform both these duties at one and the same time, it is the custom to spread cavalry out like a fan, and while on the one hand it is urged forward to search, on the other it is restrained to screen. To preserve this fan-like formation without a weak point entails the employment of a very large number of cavalry, and since the duties are most harassing, there is great wear and tear of horse flesh. Now the great object of a cavalry leader is to perform his duties with the least wear and tear of this most valuable and hardly obtained article. In order to efficiently fulfil the duties of reconnaissance, cavalry should not be hampered with screening duties, but having received its orders to explore a certain tract of country, should be told to cut itself free from the rest of the army until it comes across the enemy, and having done so, on no account to lose touch of him until the main army comes up. In the performance of this duty there should be no fan-like formation with its system of inter-contact or touch, but the main body of the cavalry should march compactly with its advanced, rear, and flank guards thrown out, while the actual work of reconnaissance would be done by independent patrols, who would move out unsupported. These patrols would receive specific orders to examine a certain place or certain tract of country. In order, however, to ensure the successful performance of the duties of reconnaissance, it is essential that at least every native officer and non-commissioned officer and a certain proportion of the men, should be able to read maps with ease and rapidity, and be able to find their way with map and compass from point to point in an unknown country; there should be no difficulty in teaching this to natives, and it should be insisted on. By a lithographic process copies of maps could easily be taken and distributed among the men, the names of places being written in the vernacular character common to the men.

The fourth duty consists of defensive measures taken to screen the movements and position of an army from the enemy, and also to give it security from surprise. These measures consist of advanced guards, rear guards, flanking patrols, or guards and outposts, and in all of them the great object is to prevent the enemy forcing the screen opposed to it; therefore to defend and not to attack becomes the principle of action. The defence can best be carried out by dismounted rather than mounted tactics; to use the carbine means to retain possession of a position and to keep the general line of the screen intact and concealed, whereas to use the sword means to advance, and to expose the screen and break up its continuity, and as often as not to endanger the flanks of other detachments. It is not uncommon to hear officers on outpost duty deride the so called infantry tactics, and to order small detachments to mount and make a useless sabre charge, thus not only exposing themselves, but giving up a position which might have been held for a long time by the carbine. In the case, however, of advanced guards and flank patrols it becomes difficult to use dismounted tactics as defensive measures; to do so would only delay the general advance. Advanced guards, on the other hand, should at all times be prepared to drive small parties of the enemy's infantry out of posts and enclosures.

We now come to a consideration of the 5th duty, *viz.*, the action of cavalry on the field of battle. This action partakes of three phases, namely employment preceding, during, and after a battle.

Preceding a battle the cavalry on one side will endeavour by the successive occupation of well selected positions, and the employment of dismounted tactics to delay the approach of the opposing army, and to cause it to deploy as early as possible. It will be attacked by the cavalry of the other side, who will also have to dismount; this fight will continue until the opposing infantry comes up; and the better the fire-arm possessed by the defenders and the more carefully selected the position, the more obstinate will this struggle be. On the conclusion of this fight, that is if after the defending cavalry has been forced to retire, the battle proper will take place in which the chief rôle will be played by artillery and infantry, but in the varying phases of this fight during the charges and counter-charges made by the infantry on both sides, many opportunities will surely occur when cavalry can charge with the sword and sweep all before it. But it is away from the battle-field itself, during the progress of the fight, that cavalry will be able to produce important results by delaying re-inforcements, breaking up the line of retreat, etc., etc., and here again will the carbine prove itself invaluable and form a useful auxiliary to the sword. So also after the battle during the persuit or retreat the carbine will hold or delay the enemy.

The above arguments strongly advocate the arming of cavalry with a carbine, not however to be used only in attaining a good musketry figure of merit, as it is at present, but to produce great and important results on a campaign, to utilize its great mobility, and, by rendering it independent of infantry support, to make it far reaching and far striking. It is not, however, by any means urged that the sword should be superseded by the carbine. The introduction of magazine carbines and the attachment of a couple of machine guns to each regiment is most desirable, because such weapons would enable more men to be retained in the saddle. But the possession of fire action is indispensable to the independent and bold action of cavalry; it will never supersede the sabre, but rather enable it to be used oftener by paving the way for a mounted charge.

Training of Man and Horse.

The efficient performance of all the above duties demands that the sowar shall receive a very careful training, and that he should not only be a good horse-man and proficient in the use of his weapons, but that he shall be intelligent, in fact far more so than an infantry soldier. Every endeavour should therefore be made to promote his intellectual powers, and a good way is for squadron commanders to devote a few hours weekly to indoor instruction and catechism; on such occasions they should make the native officers and non-commissioned officers also catechize the men in their presence.

Practical instruction in the case of sowars consists mainly of equitation, the use of weapons, mounted and dismounted drill, and gymnastics.

Equitation.—In this no better method of instruction can be pursued than that which is laid down in the drill book. After a man has been passed into the ranks he should attend riding school at least once a week, and be put through the double ride; during the first quarter of an hour of each drill he should work without stirrups.

Use of weapons.—Instruction in the use of the sword and lance has up to the present been very little attended to in the native cavalry, but now that prizes are to be given for proficiency in the use of the above weapons, a great improvement is sure to be made in this respect. Each regiment should have its fencing school and club, and men be encouraged to attend it during their leisure hours. With respect to the carbine, a quaint incongruity exists of discouraging dismounted tactics, while at the same time a high value is placed on a good figure of merit. It is a fact that greater efforts have been made to render men more proficient with their carbines than with their swords; instruction has therefore been carried out on a wrong principle and far too much time frittered away on the range. I would limit range practice as at present carried out, and endeavour by expending more ammunition on inter-troop and squadron matches to promote proficiency by creating rivalry. Each regiment should have its musketry shield as is done in most British regiments.

Mounted Drill.—The drill regulations contain such perfect instructions on this head that but little need be said on the subject. The climax of all mounted drill is the charge, and to ensure the success of a charge perfect steadiness is required in the manœuvres which lead up to it. One or two points, however, lead to unsteadiness in manœuvre, the chief being, as I have before remarked, the preponderance of regimental parades and the absence of good steady drill nnder squadron commanders. Another point also produces unsteadiness, such as the closeness of the rear rank to the front rank, the interval of one horse's length is not nearly sufficient, it should be three lengths during manœuvring and increased to about twenty or thirty just before the charge. Owing to its closeness to the front rank the rear rank undoubtedly causes unsteadiness in the former, and at the moment of the shock it is too close to be of any use, for it cannot either add to the momentum or to the weight of the front rank, and as for filling up intervals it is impossible that this can ever be done without creating disorder. Not only this, but it stands to reason that at the moment when the shock takes places a check must occur in the pace; if this be so then in the dust and confusion the rear rank becomes a source of danger to the front rank, for it is bound to over-ride it.

Dismounted drill.—The great object should be to place as many carbines as possible into the firing line, and therefore no dismounted support should be kept in hand. Every endeavour should be made to get to close quarters as rapidly as possible, and to do this long rushes should be made, and the advance pushed forward as far as possible without firing. No charge on foot should ever be made with the sword, but if the enemy are seen to waver, half of the mounted support should at once charge, and the mount being sounded, the remaining half would charge as soon as it was seen that the dismounted men had nearly mounted, the latter also joining in the charge directly they were mounted. In the case of a reverse, the combat should at once cease the instant it is seen that it is likely to be unsuccessful. All drill should be of the simplest, and the only way of dismounting by sections or by linking horses, each division to fall in in two ranks under its leader, and the attack to be made with a frontal and flank advance, the mounted support generally charging from the flank. The mounted support should never be greater than in the proportion of one third of the dismounted force.

Gymnastics.—Once a week in the afternoon sowars should be put through a set of gymnastic exercises; these are necessary to make the limbs supple, and to give the man confidence in himself.

The training of the horses requires to be most carefully attended to, and should not be carried out, as is now done, by allowing the owner of each horse to train it. Every man is not a good rider, and therefore not capable of training his horse; rather should the training of remounts be left entirely to a carefully selected staff of rough riders. Further, no horse should be allowed to be ridden on any parade, other than parades held for steadying drill, until it is a five year old, that is until it is fully developed; it would then be far more docile and last longer.

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PERSONAL RECOLLECTIONS OF THE AFGHAN CAMPAIGNS OF 1878-79-80.

BY SURGEON MAJOR GEORGE J. H. EVATT, M. D.,
Medical Staff.

PART I.

It is proposed in the following pages to place on record some experiences along the Khyber line and in Kabul during the Afghan campaigns of 1878-79-80, as it is probable that even the most trivial personal record may be of use to the future historian of that important campaign, for so far as one is aware the historian of that period has not as yet appeared.

Marking as that campaign did, a great turning point in our relations to Central Asian questions, and in many ways forming a distinct starting point of Indian army reforms, it would be a great pity if no such history was written, as it would be full of interest and instruction in many ways.

One is not concerned to-day to enter in any way into the political causes of the campaign. The time has not yet arrived to deal in full with such questions. It is sufficient to say that throughout the year 1878 our relations with Afghanistan were evidently strained, and the reception by the then Amir Shere Ali of a Russian mission, and his refusal at the same time to receive an English one precipitated a crisis, and by the beginning of October the imminence of the campaign was generally recognized. The final refusal of a passage way to the mission under Sir Neville Chamberlain at Ali Musjid by the Amir's officials led to an ultimatum and a direct declaration of war.

In October 1878, the army medical service was passing through that transition period between the regimental system of hospital organization, and the newly introduced unification system, and at this date although the hospitals were still regimental, the actual commissioning of medical officers in regiments had ceased, and one was in the indefinite and unsatisfactory condition of being a departmental officer attached to a corps.

In October 1878 when the troops were ordered to concentrate on the Afghan frontier, the 25th K. O. Bs. were detached for the Peshawar garrison, and on the 21st October 1878, they moved by rail viâ Lucknow, Bareilly, Meerut, Umballa, and Mian Mir to Jhelum, which was then the rail head of the Punjab State Railway system since merged into the North-Western line.

It is impossible to describe the condition of Jhelum and its neighbourhood at this time. The railway was pouring in supplies from down country in great quantity, and there were scores of railway waggons crowding the small station, and piles of grain, rations, and every kind of supplies stored and packed all about the place.

The grand trunk road from Jhelum to Rawal Pindi, and on to Peshawar seemed to be simply one long line of bullock carts and camels carrying loads, and troops were at all the camping grounds moving on to Peshawar. The ordinary postal carriage daks were almost impossible to obtain, officers ordered up on special duty found it most difficult to join their appointments, and it will be impossible ever to estimate what enormous sums of money were lost to the State, and what great delays occurred in obtaining supplies and reinforcements at the front by the want of the all important railway line from Jhelum to the Khyber mouth.

A lady the wife of an officer in a European regiment tells her personal experiences at this time. By great luck she managed to secure a dak gharrie from Jhelum to Pindi, but the pressure of passengers being very great, the Jhelum Postmaster asked her to permit a native officer on urgent duty to travel on the top of her carriage, a common method of carrying servants in those days. She assented, and the native officer full of gratitude at her kindness came forward holding out his sword in both hands for her to touch in the usual manner as a mark of his thanks. She, quite unused to meeting native officers, failed to understand what he meant, and thinking he wanted her to keep his sword as a guarantee that he would do her no injury during the journey, she took the sword from him, put it under her pillow, and gave it to him next morning on arrival at Pindi. It would be interesting to know what the native officer thought of the incident.

Marching from Jhelum the regiment reached Pindi in four or five days, passing on the way the Bengal Sappers and Miners and other corps moving to the front. Coming from a down country station, one now began to see for the first time the wearing of *putties* by the troops, a custom now so common, then quite unknown, and most people had never seen or heard of a "Sam. Browne" sword belt until they saw them worn by frontier officers on the road to Pindi and the front; the workmanlike dress now devised for field service did not then exist, and it was quite impossible when in *khaki* to say who people were. For some time at Dakka in the Khyber a Brigadier-General was taken for a Chaplain, as he had very little beard, and nothing whatever distinctive on his uniform to show who he was.

The Elcho boot now so universally worn in the field was never seen on any officer until the campaign was well on, and the custom of having a lanyard to one's revolver was practically unknown to the average officer in the early part of the war. In tents, in camp furniture, in cooking utensils as well as in dress, all seemed unprepared for the special character of this campaign in the highlands.

With the frontier force it was of course quite different, they and especially the Guides were well equipped, but they lived and still live ready at all times for the field. The example given to the army by these frontier corps abundantly proved that it is possible to devise a field service dress perfectly distinctive and becoming, and at the same time perfectly serviceable, and all that the army as a whole has since done is to level up to the standard already existing in 1878 in the frontier battalions.

The utter breakdown in dress that used to happen when a force was sent into the field need not now occur in India, as the field dress is practically complete. A story is told of the anger of an officer usually perfectly well turned out in cantonments, who, when dressed in the old khaki coat and going to buy stamps for his English letters, was addressed by a private soldier also at the post office "What a duffer you are to buy stamps, why don't you get the Colonel to frank your letter?" Later on reference is made to an incident where a well known photographer in the Khyber took command of the army, and was mistaken for a Bengal Cavalry officer.

The 25th K. O. B's. remained at Pindi halting for a time, awaiting final orders, and the writer in the meantime was transferred to the 1st division (Sir Sam. Browne's), then mobilizing in the Peshawar valley.

While waiting day by day for a dak to reach Peshawar, the future Principal Medical Officer of the division, Deputy Surgeon-General John Gibbons, A. M. D., passed through with a special dak. Coming from Allahabad where he had been P. M. O., and going on to Peshawar, he very kindly gave up a share of his dak, which enabled me to reach Peshawar with him.

The want of a bridge over the river at Attock was now and at all times during the next two years a most serious delay.

Peshawar was in a state of great excitement, troops and detached officers were daily pouring in, and the roads were filled with camel convoys moving out to Jumrood with supplies.

The medical officers passed through a wretched time in the few days that intervened between the arrival of the P. M. O. in Peshawar, and the marching out of Sir Sam. Browne's division to Jumrood to attack Ali Musjid.

It was simply a killing time for the medical officers, and the confusion and the trouble long foreseen by any thinking men arose in this way:—

Although the unification of the medical department had begun in England in 1873, it was still in October 1878 working on regimental lines in India.

Everyone who had studied the question must have known that such a system would not work in war time up the Afghan passes, and when the war was drawing near, the then Surgeon General Sir Harry

Ker-Innes submitted a scheme for the present field hospital system to be introduced, based entirely on the English, that is to say the German, French and Russian lines.

Some difficulty occurred in obtaining sanction from the Government of India for this change, and his scheme was not accepted.

At the very last moment, that is to say one week before the army crossed the frontier, wiser counsels obtained, and a plan of field hospitals as opposed to regimental hospitals was sanctioned, but no one knew anything whatever of the details of the scheme until ten o'clock on the morning when Deputy Surgeon-General Gibbons arrived in Peshawar, and sought shelter in some vacant officers quarters.

There were then in and around Peshawar numerous regiments and batteries ready for the field, with all their medical arrangements for the campaign complete on the regimental lines of organization.

The P. M. O. had with him but one single printed copy of the new field hospital scheme in the shape of rough proofs of a pamphlet called "*the précis*," a name which no medical officer who served in the earlier days of the first Afghan campaign can ever possibly forget.

The P. M. O. on his arrival sent for all the medical officers of corps and batteries, and directed them to bring their clerks with them to his office, and there and then he explained to them as concisely as he could the entirely new scheme of field hospitals, and directed the medical officers to cause their clerks to set to work and copy out the printed scheme on manuscript from his single proof of the historic pamphlet.

This wretched delay alone caused much inconvenience as every moment was of importance, and it is certain that few medical officers fully understood the drift of the new system at first. Practical experience, however, in a few weeks up the line of the Khyber soon taught them the good and the bad points of the scheme.

It became necessary therefore, in accordance with this new scheme, in three days, and practically in the face of the enemy, to remove all the medical officers and all the medical subordinates from their battalions; to transfer all the native hospital establishments from their regiments to the little understood new creations called field hospitals; to hand over every grain of medicines, instruments and technical equipment, tents, books, documents, and to give and receive receipts on both sides; and finally to draw from the commissariat, barrack, ordnance, and transport departments, the various equipments needed for the same units, the very existence of which was unknown outside the medical department.

If ever there was a case of "swapping horses in crossing a ford" it was here, and one can never forget the hurry, the worry, and the trouble these sudden changes caused; and there is no doubt whatever they acted most prejudicially on the health of the overworked P. M. O., and that this anxiety, together with the wear and tear of his heavy duties during the campaign, so broke him down as to hasten his death, which occurred a few months after the second campaign was ended.

In the first place he had no secretary or orderly officer, nor personal assistant whatever to assist him, that fatal blot in our divisional medical arrangements; and his wretched baboo clerks, admirable as penmen under a punkah at Allahabad, had no relish whatever for the rocks and robbers of Afghanistan, and were in no hurry to join him, and when they did they almost immediately afterwards went sick.

As the Principal Medical Officer had constantly to go and see general officers and various other officials, and to make numerous inspections taking him away from his office, there was no official there to meet officers who called for orders, or to make reports, or to ask for explanations, and the confusion was made worse than ever.

When after all this the P. M. O. was seen with his own hands leading his camels from the transport lines, it seemed as if the cup was full and the last straw laid on the camel's back; and it became evident that the very first duty of the P. M. O. of a division in wartime is to name at all hazards a secretary as his office staff officer, and a younger and more active officer as his orderly officer.

The Commanding Royal Engineer has a brigade major, the C.R.A. of a division has an adjutant, but the work of both these officers is more circumscribed and much more within a ring fence than that of the divisional P. M. O., who deals with every regiment, every hospital, and every sanitary question in his division. Without assistance the work simply cannot be done, and it is essential to have the clearest conception of this matter.

Owing to the novelty of the system, at Peshawar there was the greatest difficulty in getting battalion and battery commanders to understand what their medical officers were doing, for in those days the phrase "*field hospital*" was not understood as it is to-day, and might have meant anything to the average officer, and indeed also to many medical officers. The commissariat, the transport, the barrack department, and the ordnance department failed to comprehend what this new indenting body was, and it was not until 9 o'clock P. M., on the night before the advance on Jumrood that the tents for the field hospitals were drawn from the Peshawar arsenal.

All this hurry, this dire confusion, this wretched wear and tear of men's lives comes, and will come from not preparing in peace for war, and so absolutely assimilating our peace routine and organisation and our war customs, that a soldier of any rank will glide from one into the other almost imperceptibly. How different it was with those perfect units the frontier mountain batteries, and indeed with the frontier force regiments generally, and above all with the Guides, who go to war with as little trouble as one goes to a picnic. One learned from them more than ever the great lesson of the need of readiness for field work at all times, the be all and the end all of the soldier's existence.

Let us leave the field hospital marching out on the morning of the 19th November 1878 towards Jumrood, and glance for a moment at some of the battalions concentrated at this time in and around Peshawar.

If it be not invidious, the palm for physical fitness and complete efficiency on the old long service army lines might be given to Thomson's battalion of the 17th Foot, now the 1st Leicester Regiment. They had come down direct from the Murree hills, and were in magnificent physical form. They were probably about the last of the long service battalions of that army which was just then disappearing before the short service system, introduced a few years before, and better specimens of that old régime could not be seen; probably for weight and space occupied per man they were 30 per cent. heavier and broader than the younger men of to-day.

In India one must never overlook the fact of where the regiments are stationed before a campaign begins. The 17th foot coming from the Murree-Abbottabad gullies were in excellent form: other battalions coming from malarious stations were often quite the reverse.

When the campaign was imminent, the Rifle Brigade and the 81st Foot were both quartered in Peshawar, and they also moved forward to the front. Both battalions had suffered much from the then deadly Peshawar fever, but the Rifle Brigade, though sorely tried, held bravely on to the end of the first campaign. The 81st Foot, however, in a health point of view suffered severely. They literally went sick by half companies, and flooded the field hospitals.

The lesson of all this is most important to remember, for malarial fever, although it shows no death rate, practically ruins a force, as the least exposure on picket or out-post duty induces ague, and the man must be taken in to hospital.

The 51st K. O. L. I. (now the 1-King's Own Yorkshire Light Infantry) also marched into Peshawar at this time and were in excellent form. They had quite lately been on the Jowaki expedition, and in a measure had had their baptism of fire. In their medical inspection at Gandamak in April 1879, when they were detailed for the proposed rapid advance on Kabul, they were found very fit indeed, having hardly any rejections.

The greater age of the regimental officers of the army in those days was very marked. By comparison with the average age of to-day, there were many old men still commanding companies.

On the morning of the advance on Ali Musjid, the *junior major* of a European battalion engaged had then 38 years full pay service. He had turned back from the advance on the fort to send in his papers to retire from the service, saying "I feel my position acutely, but I cannot go up the hill."

His senior major was so old a soldier as actually to be commanding a brigade in the force.

In nothing is the army more changed than in the age of the officers.

On the 18th November 1878, Sir Sam. Browne had a meeting of staff and commanding officers in Peshawar to explain his proposed plan of attack on Ali Musjid. The P. M. O. was present and heard confidentially of the proposed turning movement by the Tartara route being decided on, and on the morning of the 20th November, the division as a whole concentrated at Jumrood and pitched a divisional camp, just in front of the then ruined Sikh fortress now so completely remodelled. The field hospital also marched out and pitched its camp with the division. Even thus early in the campaign one could see how hopelessly unfit our heavy plains hospital equipment was for mountain warfare. In the first place the tents like those of all the European troops were the huge E. P. pattern, heavy, cumbersome, and unfit for mule or camel carriage in the highlands. Again, all the equipment was packed in unwieldy camel trunks difficult to load, difficult to unload, crushing a fallen camel to the earth, and in which it was impossible to get at any small article.

No mule or mountain equipment for field hospitals of any kind existed in India, and no one knew on what lines to advance to make a mobile field hospital for mountain warfare.

The changes made in our war hospital materiel since 1878 have been very considerable, and we may safely say that as far as type is concerned the broad lines of efficiency are laid down. Details of course in this as in all departments still remain to be dealt with. Want of experience, and want of careful thinking out one's requirements in peace for war, will account for most of our troubles in 1878 on these heads.

At 6 P. M. on the night of the 20th November 1878, the turning brigades began to move out of camp, and any bystander would be particularly struck with the fitness of the 17th Foot.

A second body of troops left the camp about midnight on the same route, and at 7 A. M. on the next morning the main body, moving up through the Khyber mouth, got under weigh, and gradually moved away over the three miles of plain that intervenes between Jumrood and the mouth of the pass.

And now those in the field hospital were to feel how unready they were in equipment for active work, for that morning, early, Sir Sam. Browne rightly issued an order that no loaded camels were on that day to enter the defiles of the pass as they would encumber the column. As the field hospital equipment of every kind was entirely packed on camels, it had simply to halt on the Jumrood camping-ground while the troops marched off to the attack.

A gallant soldier commanding a gallant regiment remained behind that day to hold Jumrood. The soldier was Colonel Armstrong and the men his regiment, the 45th Sikhs, an admirable body who did first rate service during the campaign, but were destined soon after the war to lose, while still a young and active man, their gallant leader, a distinct loss to the Indian army.

The disappointment and vexation caused by this order about camels was very great to the medical officers, who stood by and saw the troops go up to the fight with only a single medical officer with each battalion, and no bearer company, or any field hospital whatever.

Deputy Surgeon-General Gibbons, the divisional P. M. O., remained behind with the field hospital at Jumrood, and in this act no doubt he was wrong, as the true place of a P. M. O. is with the general on whose staff he is, so as to issue orders for the care of the wounded and the disposal of the sick.

The morning was thus passing away, and while eating out one's heart with vexation at being shut out of the fight, it seemed that it would be possible to extemporise some ambulance aid for the division in front without using the camels or their cumbersome equipment.

It was accordingly suggested to the P. M. O. of the division that it would be well to prepare loads of blankets, brandy, beef-tea, and reserve dressings for the wounded, and pack the whole in doolies and so overtake the column.

The P. M. O. readily assented and, applying to Surgeon-Major Ramsbotham who was in actual charge of the field hospital at the time, the writer obtained the necessary supplies as well as the help of a young apothecary to assist. There was. however, no escort, nor any arms whatever with the party, and moving out of the Jumrood camp lines, the rolling ground was rapidly crossed, only a few armed hillmen being met with evidently on the look out to see how the day was going, and we caught up the rear guard of the division stuggling up the stony track that forms the entrance to the historic Pass. The 6th Bengal Infantry that day formed the rear guard, and applying to the commander of the guard, Captain Birch, an escort of a Havildar's party was obtained, and we pushed rapidly along the column crowded in the narrow defiles, and were soon well to the front. Just below the Sherghai heights the party had to halt for a time to set the the kahars at work to assist Captain Graves, who was in charge of the waggons of the elephant battery, .and whose unwieldy vehicles were jamming in the narrow tracks. This well known and popular officer died on the following July in Peshawar in the interval between the first and second campaigns.

Some miles of gradual ascent along the winding road takes one almost suddenly out of the defiles of the Khyber on to the open plateau called the Sherghai heights. These are comparatively open and rolling hills from which one commands a good view of Ali Musjid heights and fort, and of the rocky cliffs that directly overhang Ali Musjid, and well away to the left when facing Ali Musjid run the green valleys which lead towards the Bazar valley. Wilson's elephant battery was in action against Ali Musjid from a level space on the Sheghai heights, and at intervals a shrieking 40 lb. Armstrong shell went flying over the intervening valley, and either struck against the stony profile of the fort, or dashed against the masses of living rock behind it, leaving a great white patch where it struck, and a few missing both fort and rock fell behind Ali Musjid in a gorge where a number of Afghan people were under canvas, and suffered some loss from the fire.

The fort itself presented a very low and almost undistinguishable profile merging in the grey rock on which it stood, and by which it was surrounded, and was in every way a difficult object for any artillery to hit. I/C Royal Horse Artillery was also in action from another part of the heights, and the Afghans were replying by cannon shots which came dropping on amongst the troops, and now and then rolling amongst the doolie bearers who were clustered on the heights.

One brigade of our infantry was lining the heights towards the right looking from Sherghai towards Ali Musjid. This was probably Browne's brigade as the 51st were in that direction, while Appleyard's brigade consisting of the 81st Foot, the 27th Punjabis, and the 14th Sikhs were more to the left, again facing towards Ali Musjid. Every one was waiting anxiously for the development of the turning movement by the brigades which had left Jumrood the previous evening, but hour after hour went by and there was still no sign. The brigades were at this time struggling with the increased difficulties of the route, and could not possibly appear on the scene. The short November day was already closing in, and the General, resigning all hope of the turning troops appearing on the scene, gave orders for a direct attack to be made by Appleyard's brigade on the sungah-crowned outlying heights that acted as a kind of rampart to the fort, and which were lined with Afghan riflemen.

No one can positively say whether this attack was made by Appleyard's brigade as a whole, or whether the sepoy battalion alone attempted the assault.

The point in doubt is whether the 81st Foot were ordered to attack at the same time as the 14th Sikhs and the 27th Punjabis, or whether they were held in reserve to support the attack as it developed. It seems, however, that they did in part advance and were recalled. The accounts vary so far as I am aware, but this I know, that no European soldier came back wounded from the assault, nor was any dead European soldier found on the hill side next morning, so that it is evident the brunt of the attack did not come on them but on the native regiments of the brigade.

These two regiments seem to have gone forward to the attack led gallantly by Captain Birch and Lieutenant Fitzgerald, and were received by a heavy rifle fire, which killed the two named officers, wounded Captain Maclean of the 14th Sikhs, and caused casualties amounting to 14 or 15 killed and about 40 wounded in the two regiments.

As the divisional P. M. O. was not on the field, and the party was independent of any regiment or corps, it seemed that it would be better to get nearer the front, and accordingly the bearer company moved down the sloping ground into the stony bed of the Ali Musjid river, and pushing along the level ground, reached the ground at the foot of the slopes where the assault was being made.

While still moving forward, Colonel Maunsell of the Bengal Sappers and Miners, who was C. R. E. with the column, came up and said the wounded of the attacking brigade were all coming down into the bed of the river, and in the most lucky manner they came down actually on the very spot where by the merest chance help had arrived. They were all Sikhs and Punjabis of the 14th and 27th Regiments.

The men came down direct into the bed of the river, but no reserves could be seen, nor was their regimental medical officer anywhere about, and it fell to the share of the Jamrood help and to that of Surgeon-Major Creagh who was in charge of I/C Royal Horse Artillery to look after them. I/C Royal Horse Artillery had moved down off the heights, and spent the night in bivouac in a sheltered defile opening up off the river.

By absolute good fortune there were plenty of blankets, plenty of brandy, and other medicine comforts, and in consultation with Dr. Creagh, an able officer since retired, the wounded men were cared for very thoroughly, and after dressing their wounds and giving them some brandy, covering them with blankets, and giving them some sleeping medicines, by 11 P. M. they were all at rest and slept fairly well during that long and anxious night. It must have been about 5 P. M. in the evening when the wounded began to come in, and shortly afterwards we were greatly surprised to see Surgeon-General Ker-Innes come down the side of the pass with Mr. Archibald Forbes and Mr. Simpson of the Illustrated London News, and descend into the river bed. There was now no chance of mistake as to who he was. He was dressed in the undress uniform of his rank, gold cap, and cross-belt, and looked very spic and span indeed amongst the sombre khaki surroundings.

He enquired at once how we came to be there, and what we were doing, and above all where was the field hospital, the child of his own creation. He then heard of the contretemps as to the camels and how we came to be up in the pass. He was excessively put out at there being no field hospital on the field, gave some general directions about the wounded, and later lay down to sleep a few yards off on the hill side.

The native wounded behaved splendidly as they always do, and took their troubles with a light heart, *Shábásh kuch parwá nahin* was the burden of their cry, and they stood the pains of the dressing excellently.

There was of course the usual struggling to get to the doctor, and to try and draw the doctor to them, and there were, as there always is, a certain number of over solicitous comrades, whose intense sympathy with the wounded entirely overbalanced their desire to return to the front and the bullets. These latter men were utilized as a protection against any prowling Afghans, and next morning we dismissed them to rejoin their battalions.

All through that anxious night, when none seemed to know what had really happened, nor what was the true state of affairs, officers and orderlies came passing by the bivouac, and asking in vain where they could find the General, as they wished to make reports and ask for orders, but no one had any idea at all where he was, nor indeed that any attack had been made, until the wounded said that all their officers were killed, and even named Captain Swettenham of the 27th Punjabis and Major Terry of the Borderers, attached to the Punjabis as orderlies, mere reports which turned out to be false. The difficulty of finding the General Commanding at night time will always be a difficulty that needs to be specially guarded against, especially if night attacks now so much spoken of ever become realities.

In the early dawn the Surgeon-General came up, and ordered the wounded to be got back at once on to the Sherghai Heights, and us to hurry up again to the front. "We are going to have warm work," said he, "an assault in force is ordered," and he evidently spoke with authority.

Accordingly the wounded were rapidly taken back up the bed of the river and up the sloping paths to the Sherghai heights, but there was no hospital there, nor any medical officer to take them over. There were however, abundance of doolies and kahars left behind by the regiments, and transferring the wounded, the kahars were simply told, *Jao Jumrood*, where eventually the wounded arrived without escort, or attendance of any kind on the road. Their arriving at Jumrood safely was another piece of good fortune as a few days afterwards, when the tribesmen were on the war-path they would in all probability have been cut up. At Jumrood they fell into careful hands and were looked after by the medical officers of the native hospital there, and it was afterwards said that when they saw the clothes of the wounded covered with candle grease which had dropped on them during the dressing the previous night, they felt what a troublesome thing it is to dress wounded by candle-light on the field.

Having freed the doolies of the wounded, the detachment hastened back again down the slope into the river bed, and it seemed that troops from every point were converging on Ali Musjid, and every one was full of excitement with the idea that the assault would be made in force and the place carried by storm, as it was said that the tribes were assuming a threatening aspect, and that Cavagnari insisted on prompt measures being taken to capture the place.

While hurrying along the bed of the stream towards the open space at the foot of the Ali Musjid fort, and expecting every moment to hear the cannon begin, an officer in khaki came running from the direction of the fort, and crying out to all he met that the fort was empty and that the Afghans had fled in the night.

Hurrying onwards we at last reached the little white mosque of Ali that gives its name to the place, crossed the stream that runs at the base of the rock, and commenced to ascend the broken pathway that then led to the foot, where were also the General and his staff moving upwards towards the fort.

On entering the fort everything was found to be in complete ruin. The 40lb. Armstrong shells had knocked the place to pieces and the bastions at the angles were in ruins. In one of these a 40lb. shell had burst, and four Afghans who had been sitting round a dish of *pillau* were smashed to pieces by the explosion.

Posteens in quantities, broken arms, cooking pots, and ammunition lay about in confusion, and 20 pieces of artillery were lying about in the fort, and a certain number were in line at the foot of the hill.

There were a number of sick Afghan soldiers lying about, wretched looking men, evidently victims of the Ali Musjid fever, who had been abandoned when the garrison fled in the night by the Bazar valley and the hills on the right of Ali Musjid, looking from it towards Sherghai.

Of loot in the real sense there was none, and if one managed to get an Afghan knife, a koran, a drum and drum-sticks, and a pile of manuscript returns, which turned out to be the company accounts of the soldiers, one was supposed to be lucky.

Posteens could have been had in quantities, but distance lent enchantment to the view of them, and they were in a terrible state of filth. In the gorge behind the fort there was the Afghan encampment into which some shells had dropped.

The masses of troops which had been converging round Ali Musjid for the assault, were now concentrating on the bed of the river below, and for nearly a mile the place was crowded with troops, fires began to be seen, and preparations for breakfast were developing.

Many very fine mules were running loose about the place, which had apparently belonged to the Afghan mountain batteries, and although a few intelligent persons had annexed them, they were soon after compelled to hand them over to the transport department.

Some cavalry were sent forward up the pass, towards Landi Kotal, but the main body remained halting on the dry bed of the river during the day. The bodies of Captain Birch and Lieut. Fitzgerald of the 27th Punjabis were brought in off the heights where they had been killed. They had lain on the hill side all night. It was at first intended to bury them at Ali Musjid, but wiser counsels prevailed, and the bodies of these gallant men were sent into Peshawar for burial.

While examining the bullet wound of Captain Birch which was in the region of the heart, it was found that a locket containing a picture of his wife had been carred into the wound by the bullet.

The Surgeon-General sent round to the various corps and batteries to collect returns of the killed and wounded. The killed were about 14 and the wounded between 40 and 50.

All though the day, people were anxiously waiting for the field hospital to arrive from Jumrood but it never appeared.

The Surgeon General (Ker-Innes), was particularly put out at its non-arrival.

That night we slept in the bed of the river, and on the early morning the troops began to move up the pass towards Landi Kotal.

The eagerly looked for field hospital arrived during the night; it had bivouacked down the stream nearer the Sherghai heights.

With the arrival of the field hospital the separate existence of the temporary aid on the field ceased, and it reverted to the field hospital, where Surgeon-Major Davie, medical staff, was commanding, Surgeon-Major Ramsbotham and Surgeons Cornish and Ryan with others being with him.

A site for the field hospital camp was obtained on some level ground on the left bank of the Ali Musjid river, and there we formed a field hospital for the European sick of the entire division.

It should never be forgotten in choosing battalions in India for field service, that a regiment fully saturated with malaria is unfit for most campaigns, and it is quite certain in general experience, that a regiment which has suffered from malaria will also in cold climates very easily fall a victim to pneumonia.

When Sir Sam. Browne's main body moved on to Dakka, the 51st K. O. L. I. and the 6th Bengal Native Infantry remained behind to hold Ali Musjid, and for some time Wilson's elephant battery remained encamped in the open on the Sherghai heights. They were frequently fired into, and later on a company of infantry was sent up from the bed of the river to act as an escort for them.

The army in those days was certainly far from being as ready for war as it is to-day. In dress, in equipment, and in inherent knowledge of military precautions in the field it seemed distinctly untrained and unready by comparison with to-day.

Even at Ali Musjid one could see this. The camp was frequently fired into, and at first certainly little or no attempt at outpost or picket protection existed.

Over and over again the gunners who were employed in removing the Afghan guns from the Ali Musjid fort, were fired at by tribesmen close by the camp, and the gunners were seen to quit the guns and try to reply to the enemy with carbine fire, while all the time two fine regiments were lying, little if at all employed, in the bed of the stream a quarter of a mile away. A company of infantry could have paralyzed any such attacks had they been sent out, but in this as in several other matters there was want of initiative, or at any rate of right initiative at Ali Musjid. A very brilliant episode, however, was the repulse of a bold attack on a picket of the 51st K. O. L. I. The picket was commanded by Lieutenant Johnston of the regiment, and the enemy were driven off.

The tribesmen were particularly bold in attacking convoys, and the road from Jumrood to Ali Musjid, and from Ali Musjid to Landi Kotal was entirely unsafe, several convoys being attacked, and men were killed in detail. The system of holding the line of road by permanent detachments scattered along it, as opposed to convoy escorts alone, seemed far preferable. For this duty 2nd or 3rd class troops do very fairly, and save enormous labour to the troops in general.

The Surgeon-General went forward with the head quarters staff to Dakka, but the divisional P. M. O. remained behind at the field hospital at Ali Musjid.

Day after day the field hospital remained behind at Ali Musjid, and no section or detachment of it was sent forward to the front, thus leaving the troops at Dakka without any hospital accommodation.

The Surgeon-General eventually came back to Ali Musjid, and the divisional P. M. O. proceeded to the head quarters of his division; when he reached Dakka he found that the sick were accumulating in the Dakka fort in a temporary hospital organized by Surgeon-Major Creagh from his battery equipment, but without attendants, or drugs from the field hospital.

Telegraphic orders were then sent down from Dakka for a section or division of the field hospital to move up to the front, and it became a question who would be the lucky man to go forward.

Surgeon-Major Davie who then commanded the field hospital decided on sending a 50 bed division, and by a lucky stroke it fell to the writer's lot to move forward, and we marched from Ali Musjid with Surgeon Shaw, medical staff, one apothecary, and a team of native attendants. There was, however, no hospital sergeant nor writer, nor any European orderlies whatever, and the want of these men was felt very much indeed. It was quite a pleasant march up the Khyber, which beyond Ali Musjid is very picturesque and striking, and passing the great Buddhist Dajiba which crowns the summit of the defile, we reached Landi Kotal, and changing the escort pushed on the same night down the steep roadway that leads to Landi Khana, and reaching that post bivouacked for the night under the walls of the rude fort held by the 20th Punjabis.

The hospital men were perfectly unarmed and lay down outside the rude walls, and it is a wonder some of them were not cut up as many were, close to, or actually in the camps during the campaign.

Early next morning the hospital moved down the sloping road that leads into the comparatively open plain where the Khyber pass ends, and the defile opens out on the valley of the Kabul river.

It moved along without any attack, and we had no escort whatever, for things were rather easy going in the early days of the campaign.

When about a mile and a half from Dakka fort, and a partial view had been obtained of a valley which opens up to the left as one approaches Dakka, there was well to the left a cloud of dust, great shouting and crying out, and out of the dust came a crowd of men mounted on ponies and crying out "*larāi*" "*larāi*," some riderless troop horses, and a few sowars. It turned out to be a grasscutting party of the Guides which had been attacked at the head of the valley by some of the tribes. They (the latter) had killed a sowar and driven off the grass cutters.

A sepoy battalion was then encamped close to the mouth of the valley, and they immediately fell in and sent forward a company to skirmish up the valley.

The alarm soon reached Dakka fort, and very soon after a squadron of the Guides turned out and crossed the hills to the head of the valley hoping to cut off the marauders.

Pushing on to the fort, our arrival was reported to the P. M. O. and to the staff officer of the head quarters staff, who were occupying a central building on the Dakka fort said to be the quarters of the Afghan commandant.

The fort of Dakka may be considered to be the Amir's garrison holding the Afghan mouth of the Khyber, where the pass opens out into the valley of the Kabul river opposite the Mohmand village of Lalpoora.

The fort itself is a kind of miniature Sherpur, as Sherpur was in 1880. The same rectangular form, the same thick earthen wall with bastions at intervals enclosing very substantial mud buildings for the lodgement of soldiers. It formed a capital place for our '*étappen*' post on the line of communications, and during all the time I was there, several months, not a single bullet entered the fort, a great comfort when one remembers the very constant night firing into camps at other posts. There was ample and very convenient commissariat storage, and the hospital located in the fort eventually became very comfortable.

The hospital was assigned an angle of the fort about 150 yards on each side, and Surgeon-Major Creagh handed over the sick which had already accumulated in the spare rooms of the Afghan barracks.

The camp was pitched that afternoon, and next morning there was hoisted the red cross flag, the first that had ever been flown so far in the Khyber, and by noon Sir Sam. Browne came and inspected the hospital, and said it was fairly complete. It had its inherent weaknesses.

In the first place it had no hospital sergeant, a very essential element, as by an antiquated rule the medical subordinates did no clerks' or statistical work, and however many of them there might be, one could not so employ them. There had been two or three of these sergeants with the head quarters hospital at Ali Musjid, but one was not obtained for the hospital when marching away. In such a case as that one has to try and develop assistance as best one can.

Going accordingly to Colonel Thomson who then commanded the 17th Foot, I asked him to let the hospital have a sergeant who could be trained for the work. He said "I have 40 non-commissioned officers employed on various staff billets and I can't spare you a man."

This seemed hard at the time, as it was the advanced field hospital and was practically in front of the enemy, but there is no doubt he was right.

If the medical service claims independence, and demands autonomy, it ought to accept responsibility in full, and not have to go about begging for favours in every direction as it so constantly has to do.

After great trouble and delay a rheumatic but intelligent corporal came sick, and I managed to develop him into a clerk, and rejoiced greatly. The rejoicings however were but shortlived, for the divisional P. M. O. was in a similiar condition as regards clerical help, and any P. M. O. in any campaign may be in a similar plight to-morrow. Two eminently respectable cantonment type of baboos had come up with him as clerks for the campaign.

Anything more unwarlike, more inefficient, and more unsoldierlike cannot be imagined than were these followers.

The biting cold of December days, and the perpetual night firing in the Khyber were not to their fancy, and they both conveniently got sick and returned to the repose of the Allahabad cantonments. This wretched system of baboo clerks failed, as it always must fail in a real campaign. These miserable followers, unarmed, undisciplined, waiting to be cut up, are the curse of an Indian army, and although everywhere condemned, still exist, but should cease by the provision of clerks from regiments and battalions, who should be placed on the unattached lists during good behaviour.

The P. M. O., being thus left single handed and deserted by his clerks, noticed the rheumatic corporal, and directed his transfer to his own office and the hospital was again left desolate. But this is not war as one understands it. It is chaos, confusion, and certain failure in the field, and should not occur in an army worthy of the name. The placing of the follower on a military footing is a most important question for future great campaigns.

Later on the hospital picked up a sergeant and a good one too, and he remained with it for some months doing good service, a soldier and a clerk as well.

The native establishment given to work the hospital were wretchedly bad, literally and actually the lame, the halt, and the blind, as Falstaffian a corps as any man could ever see, without discipline, without uniform, or drill, or arms, or anything to distinguish them from the coolies of the Mian Mir bazaar.

With this utterly scratch team one was asked to run a field hospital, to take care of human life and to nurse the sick, things which are not possible without trained and disciplined, well paid and chosen men. To-day the lines of a corps of attendants are being gradually developed, but there is only one model to copy, and that is the model of the army. In its discipline, in its drill, in its training in peace for the routine of war, in the establishment of units identical for the one as for the other, in the knowledge of the materiel and the personnel, in the power to blame or praise some one person for failure or success, on that subordination of individuals to a chief so that success may be obtained for the army as a whole; by these means and on these lines alone can success come. The more one discriminates between the medical service and the rest of the army to which it belongs, and the more one forgets the discipline, the routine, and the methods of the soldier, by so much does one organize disaster and guarantee break-down in the field. When the then Commander-in-Chief, His Excellency Sir Frederick Haines, came through Dakka in February 1879 he said: "Now is there anything you would like to bring to my notice, speak out and keep back nothing." He was told "The native servants are as bad as they can be." Sir Frederick agreed and said a scheme was then being prepared to improve them.

Later on such a scheme was promulgated, but it still leaves these men as unarmed followers, with less food than the sepoy, although their duties are most onerous and cover day and night, and their rate of pay is still below even the moderate sepoy standard, rendering it difficult to obtain good men.

They can never be anything but a weakness to our forces until they copy the army.

Until every field hospital needed for war exists as a permanently organized unit in peace, doing duty it is true as a station hospital in cantonments, but moving to war with the same personnel, there must be great weakness in efficiency.

Just as a field battery exists in peace for war, so should a field hospital, and when war is declared it should move with its own officers, its warrant officers, its soldier clerks, European soldier nurses, native attendants, tents and equipment, and its nucleus of transport waiting for expansion in the field.

To know one's personnel, to know whom to trust, and whom to distrust, to know who is steady and careful, and who is the reverse, these things are enormously important in war, but if units do not exist in peace as in war, how are they to be known, and how can work be carried on with confidence? Decentralization here is of supreme, nay, vital importance, but then it should not be *disintegration*, and in the identity of the war and peace unit we have the key note of success.

It would be quite wrong to allow in any way that the hopes and the dreams of the reforming party in the medical service have as yet been realized, but progress is being made under the lessons learned from each campaign.

A few days after the hospital marched into Dakka, the force under Sir Sam. Browne moved forwards towards Jalalabad, leaving the 17th Foot, the 45th Sikhs under Armstrong, and Hazlerigg's battery of field artillery in garrison to hold Dakka fort.

Colonel Armstrong of the 45th Sikhs became commandant at the post, and was in every way a good man for the billet.

The writer was senior medical officer with him for several months, and never had any trouble about duty or work; once only there was a slight difference of opinion, and as it was instructive it may be referred to. When Sir Sam. Browne's force moved away from Dakka the place was in a dirty state, and required careful sanitary supervision. The camels and other cattle were dying badly as they did throughout the winter. Surgeon Ratigan M. S., was nominated to act as executive sanitary officer to make inspections and send in reports. The reports of dead camels were urgent and numerous, and I moved the commandant as to their burial.

One evening a train of camels and the driver came to the field hospital with a receipt for Dr. Ratigan to sign, as it was intended that he should became camel burier to the force.

To this I naturally objected, and requested that the transport people be ordered to bury their dead animals, and that in carrying out other sanitary work the staff officer of the commandant should be the executive, the medical department being the advising body only.

To this the commandant assented of course, and the matter ended.

There is no doubt that the conservancy of the camps in a campaign like that of the Khyber, moving over a narrow roadway, is very important, and a definite fatigue under the commandant's orders seems needed.

In any campaign the definite organization of the conservancy of posts becomes a very important matter, and in an army where caste prevails, often causes difficulties.

While the sick carriage was being arranged for the return of the 14th Sikhs, I met for the first time Brigadier-General Tytler. I confess I had no idea who he was. The field dress in those days was very undefined and every man seemed to be a law unto himself in the matter. As the Brigadier-General wore no badges, and had very little beard, I thought him a Chaplain of the force.

I thus met for the first time one of the most singularly perfect types of the Indian soldier. Few officers ever were so loved, so entirely trusted in as was General Tytler. Most considerate, most just, demanding duty to be done with exactness, and with a manner which compelled obedience, there was no officer, in whom officers and men had such perfect confidence and reliance. He had a singular calm in his manner and was perfectly unmoved in every position in the field, either in or out of fire. He had the keenest consideration for his men, and all who served under him regard his memory to this day as a great bond drawing them together. To the great loss of India and the army his fate was to die of pneumonia in the Zaimukht expedition during the 2nd campaign in 1879.

The hospital had arrived in Dakka on the 8th December 1878, and about this time continual attacks were being made on convoys in the pass by hillmen from the Bazar valley, and largely it is said by the Zakha Khels.

These hardy tribesmen from the crests of the hills watched the narrow path of the Khyber as it wound along, and woe to the straggler, the listless camp follower, the doolie bearer, or the footsore sepoy or private who lagged behind the convoy. These hawks swooped down from their hill tops, and the murderous Afghan knife soon did its thorough work. The grass-cutter and the camel men when out grazing their cattle were special victims of attack, and the wounds inflicted on them left no room for medical aid, they cleft the skull as though it were an eggshell.

These masses of unarmed followers in the Indian army is a most serious question not yet fully tackled, and the next great war will certainly force the question forward in a marked degree, if not fully dealt with beforehand.

In thinking of these days one always remembers, as a picture impressed upon the mind, seeing Major Cavagnari who was political officer with the force, addressing a crowd of the local tribesmen in the pass, and warning them, that if the outrages proceeded punishment would result.

He was on horseback dressed in the khaki uniform which all the frontier men knew so well how to make into a most soldierlike and serviceable uniform, and around him were grouped those savage mountaineers, in posteens, or their coarse friezes, and armed with jezails and here and there a muzzle loading Enfield rifle, their razor-like knives, and a few shields.

It was simply another type of the same old scene which has gone on in the world since time began, savagery face to face with civilization, and the types of both were in this example as well marked as need be.

The attacks continuing, it was determined to send a lightly equipped column into the Bazar valley to punish the marauders in their own home. A strong force under General Maude and the 2nd division staff moved across the hills from Ali Musjid, and Brigadier-General Tytler was ordered to co-operate from Dakka with a smaller column consisting of a wing of the 17th Foot, the 45th Sikhs, some of the Guides, and some Sappers and Miners. It was necessary to detail a medical officer for the 17th Foot, and Surgeon C. P. Turner, M. S., who was then doing duty in my hospital, was nominated, but at the last moment he fell sick with quinsy, and the writer proceeded himself with Tytler's column.

This was the first of those small expeditions which continually marched off from the main line of the Khyber, either for purposes of reconnaissance or the punishment of marauding villages, and which formed a special feature of the campaign.

The column left Dakka on the afternoon of the 19th December 1878, and marched onwards until nightfall, when it bivouacked on the hill sides, and had no fires or lights of any kind. Here it rested until 3 A.M. The dry clear frosty air of the winter in the Khyber was very invigorating, and the electrical condition of the atmosphere most marked; as one pulled one's blanket over one that night, it crackled and sparkled with electricity like an electric machine.

Next morning the column surprised some villages and began the blowing up of the village towers, so common an occurrence throughout the war, and in the afternoon after a toilsome march over a ridge some 5000 feet high and covered with English flowers and with mistletoe on the trees, it opened up a view of the distant Bazar valley, and began descending towards it, by night time reached it and bivouacked outside the walls of a large village. Women, children, cattle, moveables, all were gone, and perfect silence reigned over the place.

As darkness closed in the soldiers lighted their cooking fires of the spare wood and rafters lying about, and soon the place was aglow with the flames.

That night the writer sat by the fire where General Tytler, with Major Gordon his Brigade Major, and Captain Rogers his A. D. C., formerly his adjutant in the 4th Gurkhas, were gathered.

The General spoke of his former campaigns; of his regiment; and of our present expedition. But what has impressed itself most firmly on my memory was when he spoke of the medical service of the army.

He said no general officer had yet appeared in our army, who knew how to appreciate at its just value an efficient medical service. They still remained the "step-children in the military family," and much more to the same effect. Of course the writer agreed with him, all who know do agree with the truth of this idea.

Napoleon, who raised Peray and Larrey to be Barons of his empire, and in his will referred to Larrey in words which can never be forgotten, had fair views on the subject, considering the age and time. Sir John Moore, a clear headed soldier and army reformer, had glimmerings of the matter. Wellington, ever hard and unsympathetic though he was on all army questions, paid them some well earned compliments; but it remained for Dalhousie, our greatest Indian statesman, and the chivalrous Outram, the knight *sans peur et sans reproche*, to give the clearest and the most outspoken expressions of sympathy with the medical service. Slowly the conceptions of Dalhousie are being realized, but so far as one can see, the motive power comes entirely from within and not from any help from without the department, and perhaps after all this is the true progressive path. All external influences may have no real foundation with the corps itself, if reforms come from without; but it still waits the appearance of the leader, who will fully accept it into the family it has served so devotedly.

During the long December night not a shot was fired by the troops or the tribesmen, and next morning the staff rode over and opened up communications with General Maude's column, which had entered the valley from the Ali Musjid side and the lower part of the Khyber.

Archibald Forbes, the "Daily News" correspondent, had come into the Bazar valley with the Ali Musjid column, but he now quitted them, and rode over with us to join Tytler's force and to return with us by the Sisobi pass to Dakka.

That forenoon the column blew up and burned the village towers, and houses of the Bazar valley, and by noon had quitted its bivouac, and turning its face towards Dakka, began the long and difficult ascent that separates the Bazar valley from the watershed of the Kabul river.

At first all seemed as if it was to be a mere walk over, but as usual in all Afghan and perhaps in all mountain warfare, the mountaineer enemy, who never faced the column in the advance, followed it up in the retreat, and constantly fired on the rear guard.

A soldier of the 17th Foot was badly hit in the thigh, the bullet smashing the bone high up near the hip and inflicting an almost hopeless injury. Like all the English wounded, the man resented the injury most bitterly and vowed dreadful vengeance against the enemy.

The column bivouacked that night near the crest of the hills, the air was keen and biting and intensely electrical. The blankets placed over the wounded soldiers were a mass of crackling discharges of electricity.

The troops were sheltered in an oak forest, and the fires, the foliage, the starlit night, and the whole surroundings resembled rather a camp of brigands in the Appenines than the ordinary Afghan camping ground amongst rock, and stone, and barren hill sides steeped in the eternal khaki color which pervades all Afghanistan.

No firing occured after nightfall, and the troops sat round the fires in comfort while Archibald Forbes told stories of old times.

Next morning at dawn the column was again getting ready for the start for its long journey back to Dakka. The writer had been to the General to make a report about the wounded, when, while speaking to him, a shot, not a rifle shot, was fired close by the spot where we were standing, so close indeed that we thought some one was blazing at the wood pigeons who were flying about the trees close by, and the first thought was how foolish to alarm the camp by doing so.

The shot came, however, from quite another source, and in a few minutes the troops, who had been some time ready to move, began their march.

At about 8 o'clock A. M. began one of the most difficult, rugged, and dangerous descents through a series of the narrowest defiles ever seen either in Afghanistan or indeed in any part of the Himalayas.

The column seemed to be for hours descending the rugged bed of a mountain torrent filled with huge boulders and so narrow as to compel all movements to be in single file. The snow lay in the deep recesses of the defiles, but the air was clear, and the sun shone with that absolute brilliancy which it does in the perfect Khyber atmosphere.

The moment the column began to move the hidden mountaineers commenced a musketry fire from every part of the hills.

It seemed exactly like the scene in the Lady of the Lake where Roderic calls up his clansmen by whistle. From amongst the pines, from out of the oak trees, from behind every boulder came the unceasing dropping fire of the hillsmen. The General ordered each regiment to march as an escort over its own baggage, so that the column became for the time one very strong baggage guard; he himself remained with a strong rear guard holding every ridge and vantage ground, while the main body hastened along the tangled path that formed our only road.

The way the tribesmen kept cover was perfect. I took the greatest trouble with the naked eye and with glasses to search the hill sides but saw not one of the enemy. All that was to be seen was the puff of the jezail, and now and then was heard the crack of the muzzle-loading Enfield rifle. Smoke there was in plenty and close by, but never a man was seen, and had the enemy been well armed they could have done us much injury.

All through the hours the column continued this most exhausting retirement, continually followed by the enemy, losing men as we moved along, and the General himself holding the rear in person, aided by his staff, but not a man was seen to fire at.

During the retirement the unfortunate soldier of the 17th Foot, who had been shot in the thigh the previous evening and who was being carried down the defiles in a red covered doolie, came finally to grief.

The red cover of the doolie made an excellent mark for the jezailchís, and the unfortunate soldier was killed in his doolie by a bullet through his liver.

Another soldier of the same regiment was struck down by a bullet which smashed his thigh bone. The writer was behind with the rear guard, while the man was to the front nearer Dakka. Archibald Forbes saw him fall and dressed his wound, leaving him in the track with a note pinned on to his tunic. He had done all that was possible for the soldier, and the writer coming on later with the doolies picked up the man, and preserved the note as a memento of the day.

Some technical difficulty as regards the status of Mr. Forbes with the army prevented this act of his being recognized by the state, but there is no doubt he too earned the medal that day. The experiences of that day, even to an old soldier like Archibald Forbes, were, he himself said, perfectly novel, and he did not remember a nastier day.

The column got out of the entanglement of the passes and defiles by 1 o'clock P. M., but from 8 o'clock in the morning till 1 o'clock in the afternoon it was continually under fire, and the fatigue was excessive.

The sepoys took their wounds well, with the greatest sangfroid and bravery, and never resented the injury in the personal way the Englishman did, whose first cry was for revenge on the man who hit him, while the sepoy called for cheers for the sirkar.

The column continued its march all that day and did not reach Dakka fort until mid-night. The long march and the shocks of the descent told badly on the wounded, and the man dressed by Archibald Forbes did not survive the operation for his relief.

It is highly interesting to note the result of this expedition for a few days without tents on the Khyber hills.

The 17th were a singularly fit regiment, and for several days after their return did excellently well, but when the excitement passed off, the wear and tear and the exposure to the biting cold began to tell, and 31 cases of pneumonia resulted with 11 deaths.

This was amongst the Europeans only. Pneumonia is the one dread enemy to be feared on these Afghan hills and tablelands. It tells with fearful effect on the badly clad, underfed, and little cared for follower, to a large extent upon the sepoy, and to a considerable amount on the European soldier, although the latter is well-fed and as a rule well clad. The way the followers died of it was most shocking A grass-cutter in his flimsy dress would come in at three or four in the evening with his load, and seem fit and well. The icy night wind would strike him, and in three or four hours he would be dead with inflammation of the lungs. Men, who came from malarious stations like Peshawar and Mian Mir, at once fell victims, and it seems true that malarial fever so diminishes the vital energy of a man, that he succumbs easily to lung inflammation in these mountain climates. One would imagine at first sight that sufficient care had not been taken to send the man to hospital, but it was soon evident that the onset was so rapid, as to leave no time whatever for the man to sicken in the ordinary way.

It is impossible to dwell too much on the physique of the follower; the most careful inspection of all such men is essential before a war begins. Hundreds of men entered the Khyber, who were hopelessly and completely unfit for even a hard day's work in the plains.

Their physical inspection on recruitment must have been perfunctory in the last degree. Weedy grass-cutters, cook-boys of the lowest bazar scum, doolie bearers who could not lift a basket let alone a doolie, officers servants of poor physique, all such men are out of place in an Afghan field force. Two men reached the camp at Gandamak in the second campaign for hospital servants, toothless, decrepit, 70 years of age at least, and completely unfit for any work of any kind. They had been foot-balled up the Khyber from post to post, a game of sending the fool further, and eventually they drifted into Gandamak simply dying. The two old gentlemen were put to bed, and they returned to India by the next convoy, requiring twelve kahars to carry them, camels for the kahars' kit, food for the camels &c., until in the end their progress up and down the Khyber probably cost hundreds of rupees, and for what? How and why did they enter the Khyber at all? When next the army enters these passes to fight, there should be at Landi Kotal, or Dakka, as also at the Kojak a rigid physical examining post, and there let a medical officer, with the feelings and ideas of a *soldier surgeon*, ruthlessly fling aside every follower not up to a good physical standard of fitness and health. This may do much for the army, but there is a higher law still, which would say, abolish the follower altogether.

If the British regimental cook-boy is of poor physique, abolish him, and let the soldier learn to cook and fight also. Six years later than the Afghan war, the writer was for one month in camp at Tambook on the Suakim-Berber road with the Scots Guards in the Soudan. These men, fresh from Chelsea or St. George's Barracks, had neither bheestie, nor sweeper, nor cook-boy, and they were wonderfully fit under a sun beside which the Afghan sun is as nothing, and did all their own work and fatigue. The same too must be done in India, as regiments fresh from England are doing in climates similar to India, and on the Afghan table-land the English soldier can easily do everything for himself.

Officers' native servants should be dressed like their masters' regiments, and should wear on their shoulder straps the badge or distinctive mark of the corps They should have a field kit like a soldier, a havresack, water bottle, and a sword-bayonet, or other defensive weapon carried in a waist belt.

In the sepoy battalions it is difficult to see the need of any followers whatever. Water supply should be done by armed soldiers leading puckal mules, and the company sweepers should be the battalion pioneers dressed, drilled, and equipped like the pioneers of British battalions.

These men, meat eaters, with no scruples as to what rations they get, survive better under pneumonia than the vegetable feeders, for pneumonia is the real *Hindu Kush*, or Hindu killer, of Afghanistan.

Officers of native corps should supply themselves with servants in full from their battalions, letting their cooks be Mussulmans, and their syces of the same type as the mountain battery drivers, the only model of a syce we want in the army.

The whole of the permanent hospital corps should be drilled, armed and organized as sepoys, and there is no difficulty whatever in doing this, and so making the army readier for war.

That frightful mass of people, the commissariat native establishments, without uniform, without drill, without discipline, should also be dealt with, and at any rate put into the distinctive uniform of their department. Once in uniform one has an enormous hold over the individual, and the marauder lurking behind the crags of Afghanistan thinks twice before he descends to attack a man in uniform with a sword, even though that man may be but a commissariat gomashta tumbling over his sword at every step.

By such gradual action we may diminish the mass of followers in the army, and develop its military efficiency and mobility in every way.

On the return of the column to Dakka from the Bazar valley, the head quarters of the field hospital was found to be on the march up from Ali Musjid to Jalalabad and was halting at Dakka for the day. It moved on, on the morrow, to join the head quarters of the division at Jalalabad.

The winter passed over at Dakka with continual work for the doctors, and it was not until one day in March that we suddenly remembered that we had been more than four months in the field.

The unceasing cares of a big hospital, convoys arriving from the front, convoys leaving for the base, and the care of the post itself all kept one fully employed.

In the hospital one was continually confronted by the unreadiness of the medical service for war. The transport was very defective. The need of a good *kajáwa* for use with camels, a most important aid in war, was much felt, and the want still exists. If such an equipment could be found, it would carry a sick man and his kit, and be of the greatest use for evacuation of milder cases. A kind of chair for mules to carry one sick man riding across the mule would be a great boon, with supports on the saddle to prevent a weakly man from falling off.

Quick moving horsed ambulance, which could cover easily two of the ordinary marches in a day, would in the end economise forage and more rapidly move the sick towards the base. Good bullocks are so expensive and at the same time move so slowly, that their use in ambulance transport on the communications is certainly questionable. Hospital drugs too were in those days awfully unportable, too numerous, and loosely packed in big bottles as in a chemist's shop. One carried quinine to Kabul over the Lataband pass, 8000 feet high, as loosely packed in big glass bottles, as it could be in Savory and Moore's stores in Bond Street.

The compressed drugs now so general were then unissued, and the medical store depot was at Mian Mir, cut off by a long road from even Peshawar. It was impossible to get up medical stores.

Officers at Dakka had written home to England and got out supplies to Dakka before one could get drugs, even those from Peshawar. The medical service wanted then, as it wants always, to copy army systems and army methods, and the quinine should no more have gone up loose to the front than powder goes up loose in barrels to regiments in the field. Medical cartridges of pills and drugs, and compressed medicines are quite as possible as gunpowder cartridges, and few drugs are needed in the field.

A medical officer at Jagdalak was heard to complain that he could not get a rare and difficult-to-be-obtained drug for the treatment of some ailment, but it is impossible in war to meet the varying demands of various medical officers, and that man is the best army surgeon, who can utilize as far as possible the ordinary supplies found with the column, and limits himself to some twenty patent medicines small in bulk but active in property. Rum should largely take the place of brandy and poultices be made of some forage supply. To-day the medical service is far better off than we were even ten years ago in these respects. But the lesson of the army methods and the army systems is still open to be read by him who has the power to read it. The more one diverges from these principles the more one goes astray.

The doctors felt most markedly in the hospitals the want of European soldier orderlies to care for and nurse the bad cases. Situated as the British army is in India, surrounded by a race so different in customs, traditions, and ideas of comfort, it cannot draw upon them for nursing care in sickness. It is the custom in peace time in India to draw sick attendants from the European battalions in cantonments to nurse their sick comrades, and the orderlies so employed return to their battalions when their nursing labours terminate either by the recovery or the death of their patient. It is a makeshift system, but still it works. But in war when the cases are infinitely worse, require far more care, and the doctors are unable to supervise as fully as they would do in peace, they have no such men at all given them, and the sick man is left entirely in native hands.

The want is dreadful, and irreparable in every way.

The native establishment is fit only for fatigues, and not for nursing. The medical department wanted then, and it still wants, and in any future campaign it most certainly will want, a percentage of European soldiers to care for the bad cases, in field and general hospitals.

Probably 12 such men would be needed for every field hospital of 100 beds; the apothecary class do not fulfil these duties, and it is essential for the army now in peace time to prepare for war, and train these men for field work. The medical department should act just as the Indian commissariat and ordnance department do, and draw from the battalions a certain number of men on probation. Let them see hospital work, and, if approved of, be transferred to the unattached list, and be posted to the medical department for duty, with the power of remanding them to their battalions for misconduct. The Chief who accomplishes this will have made success in war still more possible for the medical service and the army, and he will certainly save the lives of his medical officers, who constantly die in campaigns from overwork of a kind that could easily be done by subordinates. It is perfectly impossible to work the field hospitals efficiently without them, and any opinion to the contrary cannot be based on a true peace or war experience.

The nursing classes lately introduced by order of His Excellency Sir Frederick Roberts, the present Commander-in-Chief, are paving the way for the final development of the main idea, but until that final development comes, and the men are given in peace for war and for permanent duty, failure in hospital efficiency in the field must be inevitable. It is better to have clear conceptions on this head now than to have commissions of enquiry afterwards, when failures have occurred and deaths which might have been prevented have taken place. For it is ever to be remembered that in any such enquiry the real sufferers give no evidence. They are at rest for ever from all such worry, and the most telling evidence is not forthcoming, nor ever can be. It lies quiet in the grave.

The then Commander-in-Chief in India, Sir Frederick Haines, came thro' Dakka on route to Jalalabad in February 1879, and Surgeon-General Ker-Innes was with him.

The hospital remained at Dakka until 25th March 1879, when it was relieved by a field hospital of the 2nd division, which division was then moving up the line of communications to allow the 1st division to push on to Gandamak.

General Tytler and his brigade also moved forward at this time to Jalalabad, and he was most careful to give strong escorts to the hospital. The writer has in war time been left in imminent danger on occasions without any escort whatever, surrounded by helpless hospital servants and defenceless doolie bearers. No soldier is ever exposed to such risks in ordinary war experience.

Sir Sam. Browne was then at Jalalabad, where the head quarters of the 1st division were concentrated. A large hospital had formed there under Surgeon-Major Porter, Medical Staff, who had arrived out from Netley in March. On the writer joining this head quarters hospital his independent existence merged in the larger hospital.

Advantage was taken of the stay at Jalalabad to visit the many interesting Buddhist remains which surround this historic old town, and we found in Mr. Simpson, the war artist of the Illustrated London News, a most enthusiastic cicerone. Sculptured faces of the Græco-Buddhist type were obtained in quantities, and shrines were unearthed which had evidently been covered up since the period of the Mahomedan invasion some 700 years before. Buddhist caves are also found on the banks of the Kabul river close by Jalalabad.

As far as Jalalabad itself was concerned, we had the good fortune to be taken round the walls by Major Bailey, the Paymaster of the Rifle Brigade, who had taken part in the old siege in 1841.

It was a most interesting and an almost unexampled occurrence that, 40 years after an event like the old siege of this town, one should have had the opportunity of hearing an eye witness describe what he had seen in the past. "From this point we saw Brydon approach." "There it was that Dennie fell." "I remember when the earthquake occurred, I was just here." "That is Piper's hill." and so on. There were in the force also some old native officers of Native Cavalry who had been up the Khyber in the old war, and at Kabul. There was a Hindustani who had been a bugler in the old army, and had remained behind at Kabul and married in the place. Certain Gurkhas of the Charikar garrison of the old days had survived the massacre there, and had remained in Kabul; some of these visited the Gurkha regiments in the Bala Hissar in 1880.

On the night of the 2nd April 1879 while sitting in the mess tent after dinner, a horse was heard galloping into camp, and some one said, "Hallo, some one has come to grief," and as Surgeon Cornish had gone out that evening on reconnaissance duty with a cavalry force under Major Wood of the 10th Hussars, there was some chaff as to its being his horse. Immediately after a stampede of horses came through the camp, and in a few moments orders came for the ambulance detachments to fall in and move down to the river. Surgeon Ryan and the writer were with one of these parties, and we took a team of doolie bearers &c. down to the river side. It was a dark night but the stars were out, and the Kabul river was dashing turbulently over its rocky and boulder covered bed, the snowy foam standing out clear and distinct against the dark waters. The roar of the river, which seemed to be in flood from the melting snows further up, drowned every other sound. We could scarcely hear each others voices as we traversed with difficulty the broken banks of the river, and made a search along its course for a considerable time. Except the sound of the rushing torrent all was still as the grave, and not a trace was evident of the catastrophe that had just occurred; and one officer and 46 men had been simply wiped out by an accident which probably will not happen again for centuries. Owing to a gap in the column the leading men of a troop of the hussars missed the ford, and seem to have gone over into the deep water, and had been swept away without giving any alarm whatever. Many of the bodies were carried miles down the river towards Dakka, amongst others that of Lieutenant Harford.

As daylight came on and the banks lower down were searched, the bodies were found jammed amongst the boulders and under the rocky banks. The men were in full field marching order, khaki with putties, and warm under clothing They had their swords on, and carried their carbines slung over their shoulders, and their pouches were full. A man so accoutred simply had no chance against the swollen river.

The bodies as they were found were brought to the mortuary tents of the field hospital, and they presented a most painful sight. Fine men in the full vigor of life, dressed and armed for the fight, were lying in every conceivable position of pain and contortion, and many seemed to have been kicked by the troop horses in the struggle, or dashed against the boulders and injured about the head and face.

They were buried together in one long grave in the Jalalabad temporary cemetery.

Surgeon Cornish, who was in charge of the column, escaped by wonderful luck, but the poor fellow was shot down by the Boers a year later on that fatal Majuba hill, and died on the field. Had a choice been his, he would have rather perished with the hussars of his own regiment to which he was devotedly attached.

Sir Charles Gough's action with the Khugianis at Fatehabad in front of Gandamak, occurred almost simultaneously with the disaster to the hussars, and the dead body of Lieutenant Wiseman of the 17th Foot who was killed in the Fatehabad fight was also sent down to Jalalabad for burial. This officer, who was not of high stature, was cut down while attempting to capture an Afghan flag, and was desperately slashed about the face with the murderous Afghan knife, the wounds of which are certainly thorough in the fullest sense.

But the Fatehabad fight, apart from its perfect result, in overawing the Khugianis, who after it gave no more trouble, will long remain memorable as being the place where Captain Wigram Battye of the Guides met his death. He was an officer of the most singular charm of manner and greatly beloved by every man in the column who had the pleasure of knowing him. Already wounded in the Ambela campaign, he met his death by a bullet wound at Fatehabad, and leaves a name which cannot be forgotten for many a day. His death was a serious loss to his regiment.

Jalalabad was now getting hot and the dust storms were very trying, so that when definite orders for the advance of the division towards Gandamak were received, every one was glad who was nominated for the movement.

The writer marched up with the main portion of Surgeon-Major Porter's field hospital, and the march was again made memorable by the utter fatigue and trouble caused by the unweildy field hospital camel trunks weighing down the underfed camels; for the march to Gandamak is a gradual rise the whole way. The time was spent on the march pulling and hauling at heavy camel loads, and helping the animals to rise. While at this work one day I saw the field hospital purveyor, a kind of commissariat gomashta, in whose nominal charge all the equipment was, passing onward reclining in a doolie, and not taking the least interest in his burdensome loads.

The whole purveyor system, by which a commissariat subordinate is placed in nominal charge of hospital equipment, although his men are too few to load it or care for it on the march, is a wretched compromise. These men like all who serve two masters really serve neither, and play off the medical against the commissariat department on a kind of battledore and shuttlecock principle, rendering themselves and their servants an element of indiscipline in any hospital.

After seeing the medical services of many European armies, I find that it is only in India this system now survives, and if the medical service demands power to do its own work and freedom of outside control, it ought to accept the responsibilities these claims entail, and be fully answerable for all equipment needed in its work. Half measures in this as in most things develop half men.

Marching on past Rozabad with its pleasant country houses, and also past the newly formed post of Fort Battye, below on the left of the line of march lay the shady gardens of Nimla Bagh, after which the column reached the height of Gandamak or Safed Sang where the division halted.

The air on those breezy heights in the early April days was cool and pleasant, and in front of the camp rose the pine clad slopes of the Safed Koh, whose peaks were still crested with snow. Along the lower slopes of these mountains lay a series of pleasant looking villages, and a track lead through them to Jalalabad far shadier and with more water supply than the central road on the valley by which the division had to march. It was such a pleasant change from the heat, the sand, and the flies of Jalalabad.

At first the force encamped in comparatively low lying ground of alluvial clay, but after a few days there it moved to a new camp site on the stony higher ground, and the doctors were busy for some time in organizing their new hospital camp. The sick began to increase as the weather got warmer, and many cases of typhoid occurred amongst the officers and men. The force lost here Captain Preston of the Rifle Brigade, Allfrey of the 17th Foot, and some other officers.

Continual shaves were in circulation as to an advance in light order on Kabul, and the medical department was continually being called upon to state what was the very minimum of equipment with which it could move on Kabul. The most hard man to deal with in all such questions was Colonel Macgregor, then Chief-of-the-staff to Sir Sam. Browne. Apparently in the rudest health himself, and cast in the mould of a Titan as far as muscular strength was concerned, he did not realize that an army should have sick and wounded, and needed carriage or establishments. This of course is a wrong idea. The more civilization advances in times of peace, the more will the return to the comparative savagery of war and field service affect that large number of men in the world whose systems keep in working order by a regular routine of food and work. The moment anything occurs to throw this routine out of gear, sickness results with many men whose equilibrium of fitness is easily disturbed.

But to try and ignore what cannot be ignored is vain work, and it is better to accept the facts as they stand and provide for them than to try to crush out what in the end never is crushed out. No army yet ever marched ten miles into an enemy's country, nor was left for a few hours without food, that the weakly men did not begin to break down, or those who managed to exist in cantonments with regular meals and light work did not begin to yield to the strain of field service.

Colonel Macgregor seemed to remain rooted in the idea that the medical department needed too much, and that Kabul could be rushed without losing more than a few men.

As regards the opinion of staff officers in general on medical work in the field, it should never be forgotten that, while a staff officer during his training for his duties, is sent to cavalry, artillery and infantry, to gather a general insight into their internal routine and methods of work, he is never sent to a hospital to see its working, nor does he ever see field hospitals at work in peace. He knows nothing therefore of the interior economy, of its fatigues, its responsibilities, or its many weaknesses in trying to carry out its work. He may therefore find fault at times without knowing the causes of the faults discovered.

A medical officer said that during a campaign he was dropped on by a staff officer for being late in moving off his field hospital. He replied, "I have been hard at work for hours this morning trying to be in time. Had you known my troubles you would certainly not have found fault."

When it is remembered that batteries and battalions are every day in peace practising their war routine, and that every man in the unit is as a rule able to help himself, while the medical service practically never sees its equipment or its personnel until war is declared, the difference in rapid working is easily explained. A field hospital can be made as mobile and as efficient as a field battery is mobile and efficient, when the hospital gets the same continued practice, the same good personnel, and the same opportunities of efficiency. Medical officers would like very much to ask any non-medical-staff officer to take over 100 helpless men, try and and move them off in time, with the scratch teams of wholly undisciplined followers. The experience he would gain would do him much good and he would learn the difficulties. It is also to be remembered that general command in the army never comes to medical men, and they are never in a position to enforce their demands for help.

As the idea of an armed advance on Kabul died out, the only excitement that occurred at Gandamak was the report that the Amir Yakoob Khan would probably come down to arrange the treaty himself, and in May he did arrive. A camp was pitched for him in a grove across the Safed Sang stream, and various parades were held for his amusement. Here for the first time in India Gatling guns were used, but they were not very successful, the machinery jamming at intervals.

The Gandamak treaty was at length formulated and signed, and many will remember seeing Mr. Jenkins, the Assistant Political officer, starting for Simla to lay it before the Viceroy; the document itself enclosed in a tin case carried carbine fashion behind his back.

As soon as the ratification of the treaty was complete, arrangements had to be begun for the return of the troops collected at Gandamak and on the communications to India, and the mass of sick at the field hospital had to be arranged for.

Cholera was already prevalent in the Peshawar valley, and the question had to be discussed whether it would be wiser to push the troops down into the cholera haunted Peshawar, and northern Punjab, or to remain at Safed Sang during the hot months, and return to India in the autumn, when cholera would probably have ceased.

The medical authorities at Simla decided that remaining at Safed Sang would not mean escape from cholera. There was at that time at Simla a very able sanitary observer, whose opinion on any such question was of great value, *viz.*, Surgeon-Major Brydon, who was at that time statistical officer to the Surgeon-General with the Government of India. Any one who reads his papers will see what a clear sighted and philosophical observer he was.

The wave of cholera was evidently moving up the Khyber, and even if part of the army did remain on the high ground above Jalalabad, a very large proportion would have had to remain along the Jalalabad, Dakka, Peshawar line to hold the communications, and they would have suffered severely. The cholera did eventually move up the Kabul road and at Kabul itself did much mischief. When the return to India began, it fell to the writer's lot to march from Gandamak towards Peshawar on the 6th June 1879, with a large sick convoy, similar detachments of sick having moved off daily for some time previously. Thus began the fatal and exhausting "*death march*," in which Sir Sam. Browne's division retired from Gandamak, leaving its airy heights for the stifling Jalalabad plains, and onwards into the furnace-like gorges of the rock-surrounded Khyber route. The convoy consisted of 50 European and three native sick. There was a mass of several hundred doolie bearers undisciplined, practically unorganized, and without any staff to keep them in order. The labour of getting these masses of men into order, and preventing them shirking their duty was very great.

While other officers in the same column joined their battalions or batteries a few minutes before the hour fixed for the column to move off, and found their companies standing on parade, practically ready at once to move off, the medical officers had to rise two or three hours before reveille, to call their kahars, prevent their running away, give early refreshment to the sick, strike camp, and be in time to move off with the column. Work like this is most exhausting. Only by the greatest efforts was it possible to move off in time with the column, and many convoys were late, and delayed the troops in marching off, thereby throwing out all arrangements as to time or distance. This always will be the case in war so long as the sick are in the hands of undisciplined camp followers with no cadre of trained men to give them form and order.

Judging by subsequent experience in the 2nd Afghan and Soudan campaigns, there is no doubt whatever as to what a medical officer should have done on this fatal return march. He should have applied to the General Officer commanding the column for a permanent armed fatigue party or hospital guard of English soldiers, and have let them day by day assist in the toil of starting a large convoy of helpless sick, so that the General might feel that he and not the medical officer was really responsible for the safety and care of the sick of his force.

Fifty men so detailed like the infantry escort of a battery of artillery would in a few days have learned the routine of starting the convoy, and 4 or 5 per cent of native non-commissioned officers, sent for duty with the kahars, would in a few days have so wheeled these consummate shirkers into line, as to minimise at any rate the daily grind of collecting them, moving them off, keeping them together in the column, and finally pitching camp on marching in.

The absence of peace training, and the divided responsibility over the ambulance transport which enables every intelligent rascal to escape serving either master, is to blame for much of this, and it would be better to accept a very small but permanent cadre in peace, that could be completely disciplined and drilled by the medical department, than to be flooded in war with crowds of undisciplined rabble with no element of cohesion in them, and no trained cadre which could be a model and a help in assimilating the remainder. Divided authority is and always will be fatal to efficiency in any branch of the service, and the more intelligent the branch the greater the danger.

It is so much the habit in both the military and the medical sides of organization questions' to try and discriminate between the medical and the military services, that it requires some courage to say that every individual in the medical branch of the army requires, in addition to his technical professional training, the spirit, the ideas, the discipline, and the methods of the soldier; and the highest technical efficiency in the military surgeon may be handicapped beyond measure, if it is not combined with what are called the soldierly virtues. Elaborate scientific training may be so overbalanced by slackness of discipline, want of punctuality, absence of knowledge of army methods as to how best to apply the scientific knowledge, that there is hardly any knowledge the soldier possesses the soldier surgeon does not need.

An incident occurred during the very early part of the 1st campaign of which the writer had the fullest personal knowledge.

While in camp at Ali Musjid field hospital a medical officer arrived with the convoy from Jumrood and dined at the hospital mess. Amongst other questions asked of him, some one asked who commanded the convoy. He replied, "I dont know what his name was, but he was a very active fellow, worked awfully hard and kept the convoy well together! I think he belonged to the cavalry." No more was thought of the matter at the time, but next morning, while walking about the camp with the medical officer, he said to another officer, " By the way there is the officer who commanded the convoy yesterday."

The commander was recognized as Mr. Burke the well known Murree photographer.There is no doubt whatever that Mr. Burke being with the straggling convoy, saw that it was his duty to do his utmost with the party of the convoy near him, and at all hazards get it into camp.

This fact is quoted to emphasize the opinion that, in an army in the field no officer and no man in the force can strictly and accurately define his own duties. He must be ready to put his hand to any work, and undertake any fair responsibility, feeling that he works for the common aim of the whole force, *viz.* victory in the field.

Any divorce therefore between the medical service and the fullest training and drill in field routine in peace for war, and any wandering away from military methods of work, would end in failure on field service and inefficient working in peace. The almost constant absence of training in drilled accuracy of work in peace injures medical efficiency exceedingly in war, and much of it arises from the absolute fear the medical officers often have of practising the routine and the methods and the applied drill of the soldier; and as a result they do not know the weak points of their field system until they are in the field, and it is too late to remedy defects.

Leaving Gandamak at the dawn of a hot June day, the return column reached Fort Battye the first post on the Jalalabad road in good form; it felt the heat more at Rozabad, which is one march from Jalalabad, and on the 3rd day it marched into Jalalabad, the sick suffering greatly from the heat, the frightful dust, and the marching in the daylight for fear of the enemy. The want of water was also much felt by the troops. Foreseeing the want of water for the sick, the writer had drawn puckals at Gandamak for the field hospital, and we had during all this return march a constant fight to keep them from the attacks of the duty soldiers in the column. The regimental arrangements with the troops for water were bad, and although it is treason to say so, it was because they depended too much on the company bheesties.

For Afghan warfare these men are of little use, whatever they may be in the plains of India, where water may be replenished every few hundred yards or so as a rule. In Afghanistan water is only found at long distances apart, and a few minutes after leaving camp the hand bheestie's *mussuk* has run dry, and he can obtain no more water until he comes almost to the next camping ground; in the meantime the soldier must do without. For it is to be always borne in mind that the ordinary water bottle used in India, made of a soda water bottle covered with leather is no use in Afghanistan. There the air is dry beyond conception, and the evaporation from the body excessive and the quantity of water the bottle holds is so little as to be useless. All those who remember the large bottles carried by the Amir's soldiers must have learned a great lesson from them, *viz.* the absolute need of having really large and useful water bottles with every man in the column, soldier or follower. What is wanting in Afghanistan is the company puckal on mules in charge of a soldier of the company who can prevent the water being wasted, or of an armed and disciplined follower for water duty. Such puckals take the place in Afghan warfare of the water cart used in European field service, and should be recognised accordingly, and by identifying them with the company, they would go with it on outpost or detached duty and be of great service.

Nothing to day is so anomalous as to see a smart well turned out mountain battery, whose duties compel them constantly to work on high ground where water is almost impossible to obtain followed by a lame underfed tattoo with a magenta coloured tail and driven by a half naked bheestie marching behind it. Most people would have thought that the water supply would have been carried on one of the best equipped and strongest mules of the team. In the Soudan the troops carried water in metal tanks fitting on the transport saddles, but they were not so cool and pleasant a water carrying apparatus as the skin puckal. Before the army again crosses the frontier suitable provision for water supply of the marching troops needs to be looked to.

About noon on the day of the arrival of the column at Jalalabad, a hot and dusty day, I was crossing over from the hospital camp towards the fort, when I met a gunner of the column coming towards me. He was faint and exhausted, and on his face was written in most unmistakable characters the fatal word 'cholera.' He was taken into hospital and arrangements made for his separate care until handed over to the local hospital authorities, but from that hour until the column separated at Peshawar the cholera haunted the march. The soldiers generally were in a depressed and exhausted state; the dust was very bad. Owing to an order from the General the troops did not march until daylight had broken and it was mid-June. Metalled roads there were none, water supply was scanty beyond conception, and day by day the troops moved along the Jalalabad plain by Ali Boghan, Barikab, Basawal, and on to Dakka, and the mouth of the Khyber. The men seemed to age day by day from the heat, and the nights were so hot as to make sleep impossible.

While thus marching in the sultry valley, on the right rose clear and cool the pine covered sides of the Safed Koh, the summits still covered with snow, and on the the left ran the beautiful Kabul river miles away from the column, but still of great use to those lucky few who were able to run down to Dakka on rafts on its swollen waters. What an enormous boon to all future travellers it will be, when the water route along the Kabul river from Peshawar to Jalalabad is made. It will deprive the journey of almost all its inconveniences.

"Sir," said one of the sick soldiers of the convoy who was travelling in a doolie, "I feel I am being roasted to death." But there was no help save to push on, and on the column pressed. Every one dreaded Dakka, which had acquired a bad name for health in the hot months of April and May. The cholera here was virulent to a degree. In one grave lie 19 men of the 10th Hussars who perished in that most fatal spot, and numbers of men of other corps are also at rest here in the rude cemetery beside the Afghan fort. Surgeon-Major Kelsall of the medical staff lies in the same place. He died in his doolie on the road between Basawal and Dakka and was hurriedly interred in the latter place.

Hurrying by Dakka the troops entered again the narrow defiles of the Khyber, a name deeply impressed on all English minds, but to-day not a shot was fired, nor did the ring of a single jezail echo on the mountains. Some baggage of the 9th Lancers was attacked but nothing more. But day by day a far worse foe than the marauding hillmen dogged the troops, and the cholera clung to us, and there was no respite from the exhausting heat.

The worst day was at Kata Kushtia, a singularly narrow defile above Ali Musjid, where the cliffs on either side tower above the narrow causeway, and where the men had to encamp on ground which seemed to have been a constant camping ground for the troops who had preceded them. All day long the men were falling sick with cholera, and the writer, up to that date in rude health, began to feel exhausted from working all day in the sun, the increasing anxiety about the hospital, the weary grind of moving it off, the perpetual strain on the march of preventing the undisciplined baggage column from swarming in on the sick and suffocating them in their doolies, already as hot as ovens, and to crown all, the cholera. Whenever one tried to sleep one dreamed only of doolie bearers, and it was just like the worry of the march and quite unrefreshing.

The column encamped next day on the Sherghai heights, the heat on the stony ground being intense, and the want of water, despite all the efforts of the Ali Musjid permanent garrison, being very marked. At midnight the stones around were so hot as to be uncomfortable to the hand, and few if any slept even amongst the healthy men; what it was for the sick can be imagined. There was, however, one hope in front. The dear Indian plains would be in view in the morning, and the troubles as far as want of shade and water would disappear.

Next day the troops moved off at sunrise as the lower part of the Khyber was said to be the most dangerous as regards marauders' attacks, and after a few miles march one saw in the distance across the hills the ocean-like expanse of the plains. Travel where one may, in Persia, Afghanistan, Baluchistan or else where, India is still the garden of Asia, and its people the most easy to get on with and the most polite in the continent. Every one felt glad beyond measure to be as it were at home again, and bore the heat of Jumrood, a trying heat in June, with patience, but no one could look at the officers and men of the column without feeling that these were indeed those who had come out of great tribulation.

Compared to the men who a few days before had left the Gandamak heights, a great change had taken place. Gaunt and haggard, marching with a listless air, their khaki clothing stiff with dried perspiration, their faces thick with a mud of dust and sweat, through which their red bloodshot eyes looked forth, many suffering from that indefinite nervous affection called heat prostration, one could not help thinking with what a burden on her shoulders England maintains her weight of empire.

Every one had had enough of the Khyber, yet it is certain that if even then in that hour of sheer exhaustion, and of a physical prostration which words can never fully paint, the order had come to face about and again enter the Pass *to go to Kabul*, all would have willingly turned round.

But the hour had not yet come, and of those gallant men that marched back into the then deadly Peshawar valley, I must have myself seen 50 die of cholera, before in the September days of the same year, we passed once more by the fort of Jumrood, the iron gates above Ali Musjid, and the graves of our comrades who perished in the campaign from which the troops were now returning.

Next day the troops were met at Hari Singh Burj by Surgeon-Major Porter, who with Colonel Sanford, R. E., had been the pioneers of the return march, and I received from him the most considerate of P. M O.'s congratulations that my hospital had come in in such good form, for sickness and exhaustion and over work had played sad havoc with some of the other hospitals.

When after handing over the sick to the base hospital at Peshawar, one enquired where one's brother medical officers were, nine were reported to be lying sick and only very few were fit for any duty, and it was difficult indeed for Surgeon-Major Porter to carry on the work. The doctors died and were invalided freely. Kelsall sleeps at Dakka, Wallace whom all describe as a fine type of soldier surgeon lies at Landi Kotal, Gray died in Peshawar of cholera, Wright who was with the Rifle Brigade and was a singularly sweet, nice fellow died at Attock of exposure while getting his sick across the then unbridged river, and Dr. Gibbons, worn out by the campaign and the anxieties of the return march, survived one year and died in England, a broken man from the day he left the Khyber; the cheery considerate Porter lived through the summer and the autumn, and on the second campaign went up with the Kuram column to Kabul and earned everywhere golden opinions. He, to the great loss of the army and the corps he belonged to, died in Kabul in the mid-winter of 1879-80, when his Chief, Sir Frederick Roberts, announced his death to the army in words which will never be forgotten while the medical service exists, and of which it is sufficient to say that he earned them well.

The man most to be pitied during the campaign was the P. M. O., Deputy-Surgeon-General Gibbons. He had neither secretary, nor orderly officer, nor proper clerks to assist him, and he ran his office with the rheumatic corporal before alluded to. The C R. A. had his Adjutant, the C. R. E. an able officer as his Brigade Major, but the P. M. O. who was responsible for the health of the division, the working of the hospitals, the organization of the convoys, and the statistical work of the troops, was single handed. Dr. Gibbons over and over again complained that no notice whatever was sent him by the staff of movements for which medical arrangements had to be made, and in consequence medical officers were bustled off on expeditions with practically no warning, yet were blamed if all was not ready. Any one can verify that by reading over the general orders issued in the later part of 1879, where Sir Frederick Haines draws special attention to this neglect, and directs more care to be taken in future.

Had Dr. Gibbons been the commanding officer of a medical regiment charged with the care of the sick of the division, he would then have had an Adjutant for discipline and secretary's work, and a Quarter-Master for camp and stores work, and he would have had orderly room clerks, and Quarter-Master-Sergeants for detail duties; but he was more than this. His duties corresponded to that of a Colonel on the staff, charged with the administration of a strong department, and in daily communication with every station and corps on the line. No doubt whatever, what he should have done was to have taken *per fas aut nefas*, a medical officer as his staff officer and secretary, and another young officer as his orderly officer, and then thrown on the authorities the duty of filling up the vacancies so caused. Then the work would have been easier and the wear and tear of the campaign minimized. However, he did none of those things, but attempted off his own bat to play a difficult and for him a fatal game. Had he died on the field the whole tradition of his office would have perished, as he had no one in his confidence or who knew what his plans were, and when we went to his office for orders, only a corporal was found there, to whom it was impossible to state one's wishes. The P. M. O. has to go out daily seeing battalions and hospitals, and if he has no one left in his office of commissioned rank it is very objectionable.

Finally let it be repeated that the medical service, mobilized in a hurry, with little cohesion, with no defined method of work, changed over at a day's notice from an old system to one entirely novel, with units not existing in peace for war but gathered together from the four winds of heaven, was not, and never can be under those conditions, an easy department to work on service. To-day things are better, at any rate people begin to know what they want; but the true model lies still before them, and that is the army one serves in and the units one sees daily at work around.

With such disciplined units, organized in peace for war, their work carefully thought out, their staff under the same control in peace as in war, with enough subordinates to do the wearying detail work, with orderlies trained and skilled in the care of the sick, and native attendants organized, drilled and trained as sepoys as well as hospital attendants, success may come; if with these there are sympathetic commanders who remember that the title "General Officer" means that he is equally interested in, and responsible for all under his command.

These ideals are not impossible, nor even difficult to realize. The faults existing are not wholly on the military, nor wholly on the medical side; both are to blame and both have prejudices that must be either dissolved or overcome. Either the medical service should throw up its claims to autonomy and accept a subordinate rôle with military commandants in every field hospital and a discipline and executive staff apart from the technical medical staff, or it should itself boldly claim all the titles, powers, and responsibilities which such commandants would receive. Men must know whom they are to obey, and discipline must be maintained, and the means of doing work must be given.

In another chapter the occurrences of the second campaign will be dealt with, where much progress was made, and the lessons learned in 1878-79 largely made use of.

NOTES ON JUDGING DISTANCE PRACTICE IN THE NATIVE ARMY.

BY CAPTAIN WALLACE, *25th Punjab Infantry.*

Wing commanders must have noticed that the present monthly course of judging distance practice is not all that could be desired. The following are some of its defects, 1st, that time is wasted while one man after another gives his answer; 2nd, that the conditions under which the distances are judged are unlike those under which they would have to be judged in action; 3rd, that an undue amount of the judging is done by sound; 4th, that under the present system one does not always get each man's perfectly unbiassed judgment.

The course I propose would be as follows.

Each non-commissioned officer to come provided with a piece of paper and a pencil, the officer superintending having a stadiometer and flag as at present.

The object consists of a party of one havildar and 10 men; each man has two rounds of blank ammunition. The havildar has six small flags about 4′ long.

First mode of conducting practice. The non-commissioned officers are drawn up in single rank extended to three paces interval. The party to be judged on is drawn up in the same way, extended to three paces interval, between 800 and 1000 yards off.

On the superintending officer giving the signal by a single wave of his flag, this last party advances by rushes of about 40 yards. Whenever the superintending officer wishes, he gives the word "distance," and waves his flag once. On the word distance the non-commissioned officers will each write down at once on their pieces of paper, the distance they would order men to fire at.

The havildar of the object party is not to check his advance in any way, but must plant one of his small flags at whatever place his party may be, when he sees the superintending officer's flag waved. At every halt after a rush, two men are to fire, independently, a round of blank each. (It would be better of course to have a volley from all 10 men at every halt.) In the course of the object party's advance the superintending officer would give the word "distance," and wave his flag, as many times as he requires answers. Each time the men would write down their answer, and the havildar of the object party plant a flag. At the conclusion of the advance, the correct distance of these flags would be ascertained with the stadiometer. While this is being done the native officers collect the men's papers signed by them, and enter their answers in the registers, correct distances and points obtained being called out as usual.

No erasures or corrections should be allowed in the figures once written, which would represent the words of command for the sighting. No more time should be allowed for writing down the distance than would be necessary for giving the word of command; after that the men should stand at attention with their hands at their sides.

Up to 500 yards the object party would advance in one general line; after about that distance, one-half of the party alternately with the other half, the non-commissioned officers being directed to judge on the leading or advanced half, with which the havildar would remain.

Second mode of conducting the practice.

The object party is placed at some point to represent a defending force, the men being extended as before to three paces interval, and firing a round of blank every now and then. The non-commissioned officers are extended as before and advance by rushes on the defending party. Whenever the superintending officer gives the word "distance," the non-commissioned officers write on their paper the distance they would order their men to fire at, and the superintending officer plants a small flag. The advance is not to be checked at that point. Papers are collected and distances of flags ascertained afterwards, as in in first mode.

The advantages of a course thus roughly sketched out are the following.

The men are not kept waiting while others are giving their answers. These answers must necessarily be quite independent, as it would be easy to see if any man were writing on his paper at any time but when ordered to, and being at three paces interval they cannot communicate.

The non-commissioned officers are taught to judge rapidly, with none of the hesitation and present possible long deliberation, which there would certainly not be time for in action. Moreover, being accustomed to judge distance so very deliberately, they are apt to get flustered when they have to do so instantly.

The present course allows too much of the judging to be done by sound. There is no time for this to be done properly in action except at extreme ranges, and if there is to be any sound at all from gun-powder in action, that sound would as a rule be such an infernal din as to render judging distance by it out of the question.

The great advantage would however be, that the men would be taught to be continually judging, from the time the enemy starts his advance, or, if the enemy is on the defensive, from the time they begin to advance themselves, to the end. They would be always ready with a distance when necessary, and would be continually deliberating on it and correcting it.

The non-commissioned officers would learn to estimate the distance they cover in their own advance, or that the enemy does in his, so that in action having once got in a good volley at a long distance, they are better enabled, as the distance becomes reduced, to form a correct estimate for the required sighting.

The present course is suitable for judging distances at night by sound, and would remain for night practice, and recruits would go through the preliminary course of drill and practice as at present; but the appearances &c., of objects and men at certain distances is sufficiently impressed on the non-commissioned officers in their range practices. There at known distances, they have continually the markers in view, and can judge of the effect of sun, atmosphere &c. on appearances.

THE TRENCH SYSTEM FOR TARGETS, AND TARGETS FOR THE TRENCH SYSTEM.

By Captain H. H. Dobbie,
30th Punjab Infantry.

The writer, having been repeatedly asked for detailed information regarding the window sash system for targets, thinks that the publication of a full detail in the Journal of the United Service Institution of India would be of use to many, to whom the introduction of paper targets on rifle ranges is a matter of interest.

Targets are arranged in such a manner, that they are exposed to view from below cover. After being fired at they are again withdrawn for inspection and repair. This is the whole principle of the system. Cover can be obtained in the following ways :—

1st.—By a trench or excavation entirely below the level of the ground.

2nd.—By a trench as a modification of the first method, and a wall or buttress above the level of the ground.

3rd.—By a wall or buttress alone.

The first is the system that has been in use in Mooltan on the 30th Punjab Infantry range for the past two years. The 2nd and 3rd methods are only corollaries on the 1st. The dimensions for one being identical for the others, the trench is taken as the type for description.

A long deep trench, then, is cut from one side of the range to the other, its limits between the mantlets which exist on all ranges. Access, free communication, and egress throughout is absolutely unrestricted even while firing is going on.

For each system of targets for individual firing is an excavation forming recesses as shewn in figs. 1 and 2. Full dimensions of these recesses are given in figs. 3 and 4.

It will be noticed that the diagrams are drawn for a five section range.

There is no reason why this should not be done on ranges where 150′ stop butts exist. The conditions required by the Musketry Regulations, *viz.* 30′ between sections, are satisfied. This interval has been determined from considerations involved in weapons of far less accuracy than those about to be introduced in the army, and is more than ample for all requirements. A five section range would be a boon to regiments of present strength, and would do away with the necessity of having such large squads, as are at present so common, when exercising a whole company together.

The sides of the trench are revetted throughout. This revetment at Mooltan consists of sundried bricks which have been found equal to all requirements. In other stations considerations of soil or permanency might necessitate a more solid revetment. These rude walls are covered over with a plaster of mud and bhoosa, and have the advantage of being easily constructed by all natives of the agricultural classes, and cost nothing to erect or to repair.

The main objection to excavation of any kind whether in Bland's butts or any modification thereof is the difficulty of drainage. This difficulty is recognized, and met in the construction of a glacis on either side of the trench.

The accumulation of water in a trench is from three causes.

1st.—Direct rainfall.
2nd.—Inundation.
3rd.—Percolation.

By raising the mouth of the trench above the level of the ground inundation is obviated, while at the same time the earth obtained by excavation is utilized in the formation of a glacis, and the presence of a glacis protects the trench from percolation.

Direct rainfall then under these conditions is the only factor in the drainage question that has to be provided for.

Fig. 4 giving a section through one of the target recesses shews a deeper portion, which serves a twofold purpose. First for drainage, and second for the manipulation of the targets.

These in aggregate are sufficiently big to hold a 6 inch rainfall into the trench. No allowance is, however, made for absorption of water by the ground itself, nor for any precautions being taken to prevent rain falling into the trench. A much greater fall than six inches would therefore be necessary to tax the capabilities of these reservoirs to the utmost. But not only is the amount of water that would be absorbed before accumulating considerable, but the precautions that can be adoptted to protect the trench from rain are numerous. Tarpaulins spread over the trench would prevent a drop from falling in. This is undoubtedly the most efficacious method, but at the same time is the most expensive. Tents utilized for range purposes, rough hurdle work, or matting could be erected over the trench so as to keep the rain out.

But on ranges in the hills and some plain stations trenches may be impracticable. Substitute the wall, and all drainage difficulties at once disappear.

The height of the stopbutt, however, then becomes a question to be determined. Ought it to increase in proportion to the height of the wall?

At first sight this seems inevitable, so that when a wall say 6 feet high is built, above which to expose targets, it appears necessary to rise the stop butt also 6 feet. It must be taken into consideration, however, that the height of the stopbutt (18 feet) is unnecessary except to catch ricochet bullets. If ricochets did not occur the height could be very materially diminished.

Now the erection of a wall and the raising of the targets above the level of the ground does not in the least affect the power of the stopbutt to stop ricochets, but rather results in eliminating ricochets from consideration altogether. For the target being exposed above the wall, a low shot, that under existing methods would be a ricochet, would be caught by the wall below the level of the foot of the target. A *proportionate* increase in the height of the stop butt therefore is unnecessary, while it remains to be determined whether any increase at all is required.

In hill stations where nature provides her own stop butt, this difficulty does not exist, so that the trench system, or rather its corollary in the introduction of a wall, is eminently suited to such ranges, as also it is where the stopping of stray bullets is not a matter of importance. His Excellency the Commander-in-Chief at Meerut at the last B. P. R. A. central rifle meeting used the following words.

"The individual proficiency in rifle shooting of the army in India has reached an exceedingly satisfactory standard; our aim now should be, not only to maintain this standard, but to do all in our power to ensure proportionate progress being made in collective proficiency."

The maintenance of efficiency demands the best system of targets.

The working of targets on the window-sash system has been the principle in use at Wimbledon for the past 20 years. Having stood there the test of time and that too amid the severest criticism in the shape of good shooting, it cannot be doubted that the world knows its superiority over other systems.

The trolly and window-sash system are both in comparison at Meerut, under B. P. R. A auspices, side by side: the latter claims the following points.

1st.—Less room is taken up on the range, allowing of the provision of a greater number of targets.

2nd.—There is no liability to have an unpleasant shadow thrown across the target by a rising or declining sun.

3rd.—Targets always appear in the same position.

4th.—Targets are not liable to be moved, as they are on trollies, by a passing gust of wind.

5th—Marking is much quicker.

6th—Far less expensive.

The details of the system as given in figures 6 to 13 are not those in work at Meerut, nor are they so far as the writer is aware those in use at Wimbledon. As before mentioned, they have been with slight modifications in use on the 30th Punjab Infantry range in Mooltan for the past two years, and can be seen there They have all been worked out by the writer to satisfy the requirements of the up-and-down system, which first came under his notice as a member of the cadet corps of a public school seventeen years ago.

To return to detail. In each target recess is fixed a beam, figs. 3 and 12, let into the wall on either side. On this beam rest two pair of slots. Figs. 6 and 7 give full dimensions. These slots are fixed in position to the beam by two bolts, figs. 6 and 8, and in them the targets work.

In the beam are inserted two wheels, fig. 9, in places cut out to fit them, fig. 3; over these wheels run ropes for attachment to the foot of each target. Target frames, figs. 16, 17, 18, are made of inch wood four inches wide. Deal is quite good enough. The figures explain themselves and the method of construction. Care should be taken that the outer edges are intact, and not cut to admit the middle or end cross pieces. They are thus able to run freely in the slots, while rounding off the corners lessens friction. Small blocks, a, a, figs. 16 and 18, by catching in the slots, limit the "run" of the targets, ensure a constant position for exposure, and necessitate targets being square.

Experience has shewn that these wooden frames are equal to all requirements. Wood of lesser thickness than an inch is liable to break off in a strong wind. Thicker frames are more liable to damage from bullets, especially those from the snider rifle.

Wooden frames give absolute security from accident to men working the targets. The best and more carefully made iron frames do not render markers free from liability to accident I have seen an accident occur which might have cost the marker an eye had it happened an inch higher up. He was marking on a knife edge frame when a lead splinter struck his cheek and tore open the skin. It is much easier also to fix the paper targets on to wooden frames, and though it is admitted that they do not last as long as the iron frames, and are more expensive in the long run, still the immunity from danger to the markers outweighs all that, and in the end if a relieving regiment refuses to take them over, why there is a satisfaction in being able to utilize them as fire wood, which is more than can be said of iron frames to the unpleasant experience of some On the accuracy of shooting depends the durability of wooden frames, but it is found from experience, that they will last out a whole season as a rule.

On the beam also are supported two pairs of slots in which the targets work.

These slots are of simple construction, consisting each of 4 rectangular pieces of wood screwed up together. Pairs are fastened together by 10 inch bolts, fig. 8, and saddle fashion are placed on the beam. They can thus be easily slid along the beam, and readily admit of any sized targets being introduced. A second 6 inch bolt, fig. 8, passes through the beam and secures the whole in position. The method of preparing for practice is as follows :—

Fix right pair of slots in position, and tighten up both bolts.

Join left pair of slots by upper bolt, loosely, and place them over beam, allowing room for targets.

Place pair of targets in right slots.

Slide up left slots on the left edge of targets. Insert lower bolt through left slots, and tighten up.

Fix rope to rear target.

Raise front target and hook on to rope. The targets are then ready to move up and down.

Should the targets appear to lean more to one side than another, correct by means of adjusting nut, figs. 10 and 12, till targets are perfectly square. They are then ready for use.

It will be observed that the whole of these manipulations go on from the trench. There is no necessity for any assistance from above.

In cases then of accident to the working, it can be corrected from the trench itself, without involving in the least any cessation of fire on other targets that are working well. This is an important consideration, and is a feature of the system. At Meerut last December during the central rifle meeting on more than one occasion, an accident to a target on one section of a range necessitated the cessation of fire on adjoining targets, notwithstanding that they were working excellently, until that accident had been corrected. Those who were the victims of such misfortune could speak of the annoyance it gave rise to.

But not only can accident be rectified without involving a cessation of fire, but a new and distinct type of target can be substituted during the performance of any exercise, without any difficulty. This feature lends itself to the reproduction of conditions that would be met with on service, and is both novel and practical for purposes of instruction.

To return to the beam. The following is a simple method of fixing it in position without resorting to permanent masonry.

Take two old logs of wood about one foot in diameter. Square roughly and cut a slot across each two inches wide and six inches deep; cut away the corners of the target recess * * fig. 3, to about two feet down. In these cuttings lay the log. Place the beam in the slots tarring well, and adjust so that it is level, and one foot, measured from its upper edge, below the top of the trench. Brick up again to the top, and plaster. The logs form supports for the beam and prevent any sinking that might otherwise occur. Logs of sheesham wood are the best as being proof, if any thing may be considered so, against white ants.

The wheels, fig. 9, are two inches in diameter $\frac{3}{4}''$ thick. Two iron ends of 1″ by 1″ section are bored for the insertion of the wheel axle, which has a screw worm cut on either extremity. To one "end" is attached an iron hoop (see fig 9) to keep rope in its place. Two wheels and one spare one are required for each set of targets, their positions varying for the different sized targets in use.

The best rope is that obtainable from an arsenal as $1\frac{1}{2}$ inch tarred hemp. At each end an "eye" is spliced over a metal centre, (fig. 15), so that the length of rope from end to end is 12′ 6″

To the rear target this rope is fixed by means of a figure of 8 hook. To the front target by means of a hook, fig. 10, the adjusting nut of which facilitates the "squaring" of the targets.

At the foot of the target, is fixed a metal clamp, fig. 11, in such a manner that the ring protrudes beyond the edge of the targets outwards, that is to the rear for a rear target, and to the front for a front target. This difference is the only distinction between front and rear targets. To this clamp is attached the rope.

The targets then are in position ready for work as follows. :—

Say rear target, fig. 12, is exposed to view. A shot is fired at it. It is pulled down and the value of the shot is determined, say an outer, fig. 12, which is signalled on the front target now up. A spotting disc, fig. 14, is taken, the plug placed through the card black face out, and inserted in the bullet hole. Another shot is fired. The front target is pulled down and the same process repeated. The rear target is now up, the spotting disc shewing the firer the exact spot struck by the last bullet on that target. After the next shot the front target is again pulled down, the spotting disc transferred to the new hole, and the old one patched up.

The spotting disc consists of a piece of card of such a size as to be just visible to the firer by the naked eye, one side white, the other black; three sizes are found convenient 1½, 3, and 6 inches diameter.

It will be observed then, that not more than two bullet holes can be on the target at the same time, thus securing perfect accuracy. A ricochet is unmistakable, both because of its sound and the dust thrown up against the target, let alone the shape of the bullet hole.

Fig. 13 gives a section of the targets in position.

It will be observed that not only does this system provide targets for individual firing, but it can also provide an excellent vanishing target of any dimensions. Fig. 21 gives a type of ordinary moving and vanishing objects, which are worked from the trench in the following manner:—

Moving target.—The trench is divided into as many "runs" as desirable by single iron targets erected three yards from the trench or more. Two targets (fig. 21) are required for each "run," each held by a marker, before starting, edge to the firer. When the practice commences the leading marker turns the face of the target towards the firer, and holding it in the position of a rifle at the present of the manual exercise, starts off at the required cadence (slow, quick or double time) towards the other limit of his "run." When he has crossed over the next follows and so on. If a shot strikes the figure it is at once seen by the marker, who thereupon stops, brings the target into a horizontal position, and so finishes his "run"; on arrival at the other end the target is fitted with a spotting disc or patched up in the usual manner before starting again. The disappearance of the target is thus the signal to the firing point that a hit has been made, and has the advantage of being unmistakable, while the insertion of a spotting disc facilitates instruction.

The leading man of each run maintains the lead throughout so that there is no confusion of targets.

It will be observed that there is nothing to restrict the motion of such targets, whether in pace or otherwise. There is no chance of a hitch in the middle of the run owing to a rope out of place, or what not, that so often occurs now to spoil the whole practice.

Vanishing targets. Are worked in the same way. A squad of men of any number desirable takes up its position in the trench, facing the firing point. At a given word targets are raised together or independently, and rested on the 2′ step, fig. 4, and on command again disappear. Any variation may be adopted whether in manner or position of appearance, while any kind of target can be exposed.

This system further lends itself to the reproduction of an independent firing, such as would be expected to occur on service.

The whole trench is lined with targets, fig. 21, which can be made to appear independently. Each target then, in its own time and without any regard to those on its right or left, is made to appear and disappear. The time it remains in view should be just sufficient to allow of aim being taken and a rifle discharged, while this could practically be done by firing blank from the trench at each exposure. A very effective and practical exercise can thus be introduced without any difficulty, having in it a resemblance to reality that is at present unknown and beyond the power of any system to produce, while at the same time it is novel, and instructive.

As to the cost of constructing and out-fitting such a trench.

The trench cost us nothing! It was all excavated by regimental labour, and all that had to be supplied were a few pounds of bhoosa and half a dozen brick moulds. It was done in the hot weather during the slack musketry season. There is no reason why the same procedure should not be adopted in any native regiment. In British regiments different considerations appear, and for them a small outlay would be necessary.

The price of wood varies in different stations, but a complete outfit for a range, consisting of 15 targets of each size, making one pair of each size for each section, and one to spare in case of accident, together with 40 running targets, and all requisite beams, logs, ropes, and iron work, would cost about Rs. 120 as an outside estimate. All the iron work was made in the armorer's shop, while all the targets, slots, and other wood work was made, under supervision, by a sepoy, whose qualifications are not higher than those of a second rate village carpenter. I have heard of regiments spending three thousand rupees in the construction of targets that after all cannot be used. In the face of that, the small outlay required for the targets above described, must be considered moderate in the extreme.

The following attack practice is suggested as an eminently practical exercise, and shews the capabilities of the system for reproducing conditions as they are to be found on service.

A Company is formed up at 800 yards from the trench, and in the ordinary way prescribed by the Infantry Drill of 1889 proceeds to attack it.

The position represented by the trench is occupied as follows:—Forty running targets, fig. 21, line the trench worked by 40 men. These form four squads of 9 targets each and one more for a section commander. The nine targets of each squad work as vanishing objects, while the 10th or section commander is a moving target varying his position from one end of his squad to the other, as if supervising their action.

Not only then is the presence of an enemy produced, but the conduct of the targets can be made to approach reality. When the attack commences, the squads under orders of their section commanders appear together as if firing volleys. This volley fire is maintained till independent firing is ordered, when all forty targets, in independent order, appear and disappear. Add a second rank of men in the trench with rifles and blank ammunition, and the fire of the defenders is also reproduced.

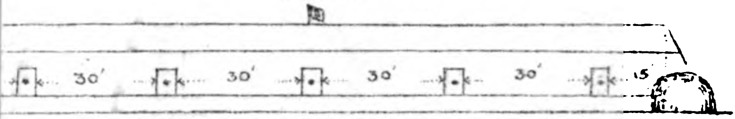
Targets, figs. 19, 20, can also be introduced in the slots as vanishing targets if required, in the following manner.

The larger targets, fig. 19, are placed in position as rear targets, the smaller, fig. 20, as front targets. These are suspended on the slots by means of catches not visible in the diagrams, similar to those at the feet a. a.

Ropes are attached to rear targets only, which can then be worked by hand. As the practice progresses, the smaller targets can be substituted for the larger ones by attaching the ropes to them, and exposing in like manner.

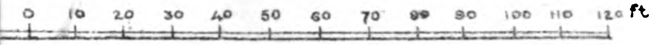
The above practice shews the resources of the trench system for practical instruction, and is an example of what the soldier must expect to encounter in action; it therefore presents an argument sufficiently forcible of itself to establish the value of the trench system and the importance of its adoption.

FIG. 5.



ELEVATION.

Scale $\frac{1}{480}$



Scale $\frac{1}{480}$

Scale $\frac{1}{40}$

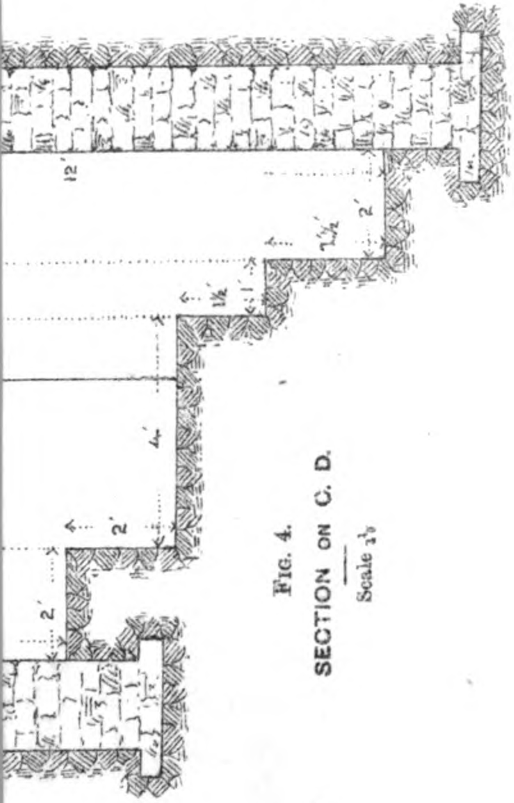


FIG. 4.

SECTION ON C. D.

Scale $\frac{1}{40}$

(Sd.) H. H. DOBBIE, *Capt.*,
30th Punjab Infantry.

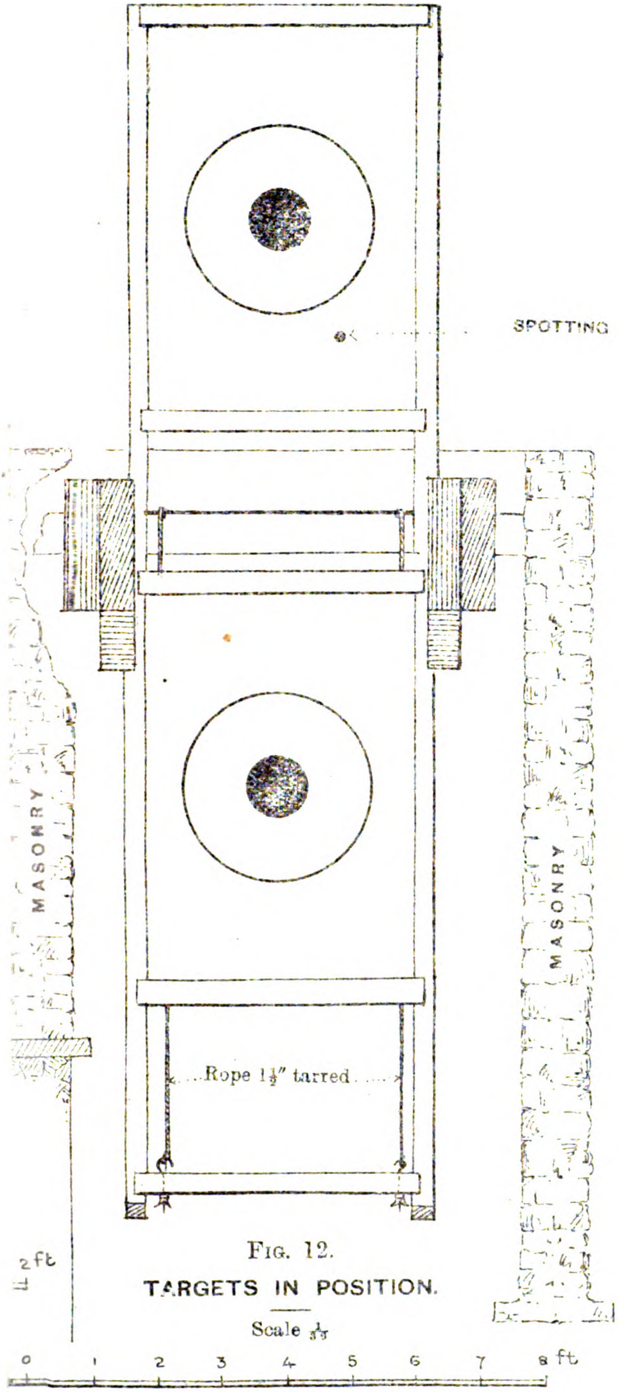


FIG. 12.

TARGETS IN POSITION.

Scale $\frac{1}{36}$

Scale $\frac{1}{36}$

(Sd.) H. H. **Dobbie**, *Capt.*,
30th Punjab Infantry.

UNIV. OF MICH.

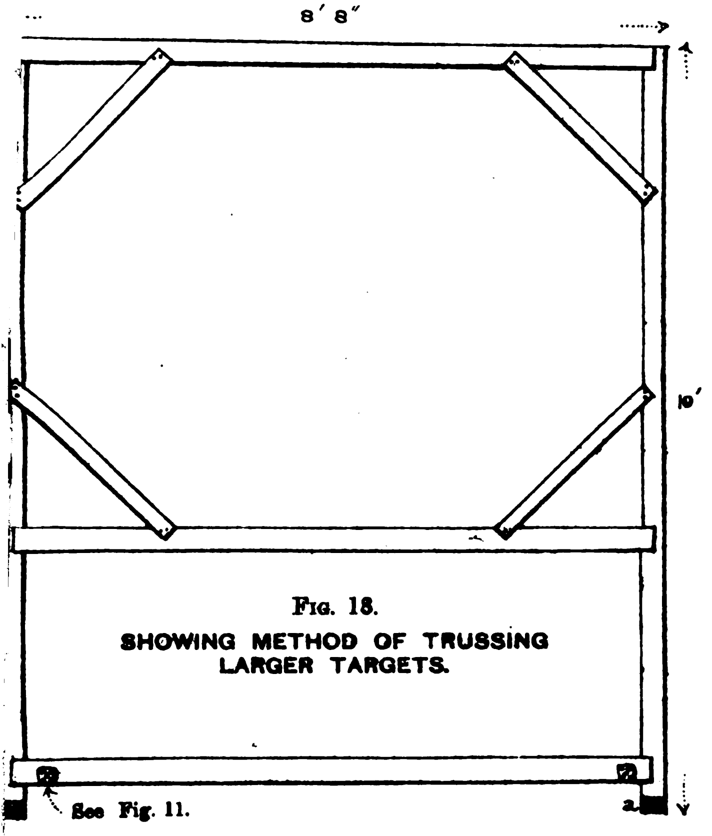


FIG. 18.
SHOWING METHOD OF TRUSSING LARGER TARGETS.

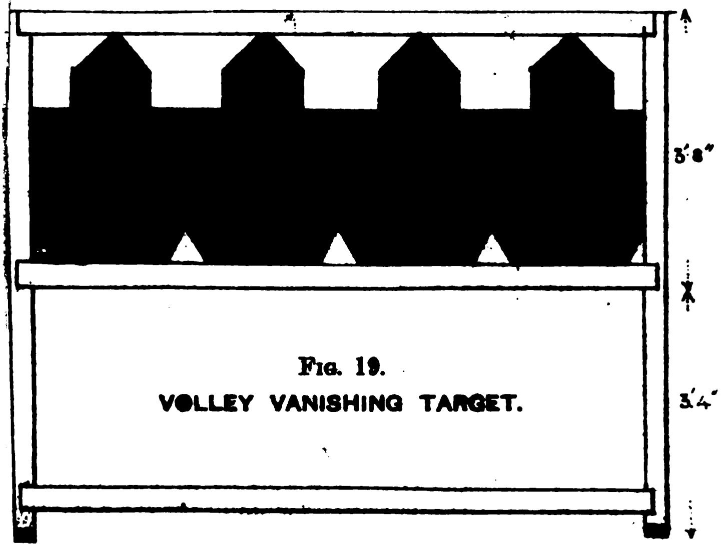


FIG. 19.
VOLLEY VANISHING TARGET.

(Sd.) H. H. DOBBIE, *Capt.*,
30th Punjab Infantry.

UNIV

ENTRENCHMENTS—THE ATTACK.

BY CAPTAIN A. E. JONES,

23rd Pioneers.

The question of "How to attack entrenchments," or "How to attack an entrenched position," is one of the most urgent and burning questions of modern tactics. In the warfare of the present day magazine rifles, smokeless powder, and the great increase in the power and accuracy of the field gun in every European army have given entrenchments a special significance, owing to the annihilating losses which troops now suffer who are exposed to fire in the open.

We may regard it as almost a certainty that, in future warfare, troops on the defensive within an hour from the first appearance of the enemy will have already entrenched themselves, *i. e.* they will have covered themselves from the *mitraille* to such an extent, that they will be enabled without suffering heavy losses to continue entrenching themselves under the enemy's fire Should a few hours be available the position will be entrenched so strongly, that to carry it by storm or by a single sharp attack will seldom succeed. In a few days field works or even such important works as may come under the heading of "Provisional fortification," as for example at Plevna and Duppel, will have sprung up, and the attack of these is usually accompanied with great difficulty, and not unseldom will turn into a regular siege. The success of a storm will no doubt lead to brilliant results, as in the case of Duppel and Tel-el-kebir, but again its failure will usually lead to a complete defeat. Presenting as they do, such great advantages to the defence, entrenchments, as if they supplied a living force, make it possible for a weak detachment to maintain its ground against a much stronger force of the enemy, and also permit a force numerically weak to occupy a larger position than would be possible otherwise.

By affording cover from fire and thus diminishing loss, entrenchments both maintain and improve the morale of the troops. In war we cannot always be certain that our troops are in better heart and condition than those of the enemy; the spirits of the one may be raised by success in some insignificant skirmish,—and it is only those who have served, who know how small an event will turn the tide of feeling one way or the other—or even by a great victory, and those of the other depressed by defeat. Even if at the beginning of a campaign the quality of the troops is the same, in the end the scale will most assuredly turn in favor of that side, which exists or has been existing under the best material conditions, and in war when troops join in battle what is the material condition exceeding all others in importance but the ground; and for defence, the nature of the position occupied, the strengthening of which costs nothing and demands only time, energy, and forethought? One would think that such a cheap and easy means of aiding the defence would be invariably resorted to; and if formerly full advantage was not taken of entrenchments, as if no necessity was felt for them, the cause may be ascribed principally to the weakness of the fire-action, and arising from this, the small development of the science of the Field Engineer; and partly to the influence of mistaken views on entrenchments, which exaggerated their deficiencies and decried their advantages There are, no doubt, deficiencies, but after all the main objection that can be brought against entrenchments is that, by increasing principally the passive force, they diminish to the same extent the aggressive force. This may be true, but we do not agree with those who say that entrenchments entirely destroy the mobility of the troops, because they quit them unwillingly to advance. The Germans even, have a proverb that "In entrenchments soldiers bury their energy." With bad troops this may be so, but with good troops, their mobility and readiness for attack are certainly not decreased by entrenchments, but on the other hand, these same entrenchments sometimes even help them forward by enabling them before an attack to collect in force under cover. Many examples may be produced from military history in support of the assertion, that entrenchments not only strengthen the defence but even aid offensive action. The successful assault of the Danish works at Duppel by the Prussians in 1864 is a good example. The Danish works came under the heading of provisional fortification, and the Prussians had finally constructed their third parallel within 300 yards of them, and by "noon the Danes were driven back into the bridge-head opposite Sonderburg with a loss of nearly 5000 men."

In October 1877, Skobeleff opened trenches, because it was only by such means he could hope to conquer the crest of the Green Hills. During the last days of Plevna on the 27th November 1877, entrenchments did not prevent the Russians assuming the offensive, but on the other hand the Turks, for want of training and discipline, could not venture from their works and trenches, when the Russians were repeatedly broken against them in futile attacks.

The question under consideration may be briefly stated as follows:—"What significance have entrenchments in modern war, and what is the best method of attacking them?" Our text book of fortification in speaking on this subject says—"The attack should be preceded by as full a reconnaissance as possible, to ascertain the best line of approach, the strength of the garrison, and the numbers and positions of the outer reserves." Quite true no doubt, but evidently more applicable to the attack on a closed or half-closed field work than to one on a long line of shelter-trenches and breast-works. In both cases, to be successful, great qualities are requisite in the troops and more especially in the commander, and we may write these down as caution, deliberation, preparedness, taking every thing into consideration, method, system, trusting nothing to chance and risking nothing.

In the campaigns of 1866 and 1870-71, we find that the Germans never attacked the enemy in a position strengthened throughout, and never once risked the storm of a fortress or fort, but on the contrary, they forced the enemy to break himself against their entrenchments (Metz, Paris.) This cannot be ascribed to chance, but was evidently a system, arising from the national character, and the personal qualities of the real commander in each campaign *viz.*, Count von Moltke.

During the present century the Russian army have had more fighting, and assuredly have had more practice in attacking fortresses and field works than any other in Europe, commencing with the storm of Kars on 16th March 1807, and ending with that of Geok Tepe in 1881. Not unfrequently they have gained brilliant successes, but again, they have also suffered many severe defeats, which have taught them that the attack of entrenchments is far from being a simple and easy business, and the question of "How to attack entrenchments," is still being keenly debated by them. An attempt was made to solve the problem in 1886 during the camp of exercise at Krasnoe Selo, and various attack formations were tried against the field works and entrenchments constructed there, but, as far as we are aware, up to the present time, no definite decision has been come to on this important subject.

Since the introduction of breechloading arms, with the solitary exception of the battle of Tel-el-kebir, which was without doubt a brilliant success, but gained under very favorable conditions and against inferior troops, the British army cannot be said to have had on any occasion to attack an enemy in an entrenched position, and therefore our own experience on this question is practically nil.

Let us see what our latest ideas are on this subject. The Infantry Drill 1889, in describing the attack formation to be adopted in the future, says—"The duty of the firing line reinforced by its supports and reserves is to get as near the position, as possible but when it cannot advance further without unnecessary exposure, advantageous ground will be chosen, whence a telling converging fire may be brought to bear upon the parts of the position to be assaulted. By the time the first line reaches this critical distance, it will have sustained such heavy losses, that decisive action becomes imperative, and a fresh impulse is necessary to carry the attack forward and pierce the enemy's line. This will be given by the second line, which will, under cover of the first line, have been able to advance in good order and under perfect control. Its commander, having watched the opportune moment when the defenders are sufficiently shaken, will boldly advance with the second line towards the point or points he has determined to assault. On reaching the firing line, the second line will double through it, and with loud cheers, carry the position at the point of the bayonet, drums beating and bugles playing; the firing line will join the second line and assist it in delivering the assault." And again "The men will be taught the necessity of advancing immediately a volley is fired, before the smoke clears away and exposes them to the enemy's view. The advantages of independent fire at the final stage, from the cover which its smoke affords to the second line to push forward to the attack, are self-evident."

Most of this is true enough, and the actual formations adopted are probably as good as any others that have yet been devised, but all the same such a mode of attack must fail, and will fail if used frontally against good troops occupying any entrenched position, however slight the entrenchments may be; and in our Infantry Drill no difference is laid down or apparently recognised for the attack of an enemy occupying an entrenched or unentrenched position. Of course the regulations also say—"The formations adopted by the attacking force must be suited to the character of the enemy, to his mode of fighting, to the weapons with which he is armed, and to the ground to be traversed;" and also, "The science of leading infantry consists in adopting the formation most suitable to the object in view, in utilizing all advantages of ground, and in concentrating fire according to time and place:" but at present troops are usually trained in practising one form of attack, and as for adopting the mode of attack most suitable to the object in view, *viz.* to turn the enemy out of his position, or changing any of the formations laid down by regulation, such an idea is seldom even thought of, and but too seldom practised.

The second extract made from Infantry Drill speaks about the cover which the smoke affords to the first and second lines to push forward to the attack, but in future warfare with smokeless powder, there will be no such cover for them, and they will have to advance in full view of the enemy, uncovered except by the accidents of the ground, and under the close and more or less steady and well-aimed fire of troops armed with rifles of low trajectory; a very important factor, which will have to be taken into account in the warfare of the future much more so than in that of the past. Moreover from our own experience in Egypt we may see how difficult it is, to maintain the intervals between the different lines in the attack formation.

At Hasheen as the firing line of the Berkshire advanced up the hill, the supports gradually closed on them, and formed one body on arriving at a saddle near the summit.

Our Infantry Drill, in speaking of the attack of a battalion, divides the distance to be traversed into three zones, the third zone being divided into two phases, the second phase being described as "150 yards to position;" and in speaking of how this distance is to be traversed, it says "On independent firing commencing, the second line will move forward at a steady double. As it approaches, the captains with the first line will blow their whistles as a signal to cease fire and fix bayonets. All officers will then draw their swords and run to the front, the second (or assaulting) line will pass through the first line, which latter will immediately join the second line."

This really amounts to saying that for the last 150 yards of the advance, all fire will have ceased on the part of the assailants: but how will the antagonist act during the time? Very simply: he will open the very hottest fire possible, and it is at this period of the fight that the magazine rifle will come into play, and its destructive qualities be fully realised, for the defender without being punished himself will be enabled to pour in a close and well-aimed fire on the thick line of assailants advancing towards him. We say "without being punished," for during these few minutes, when on the side of the assailants not a single man is firing, the defenders will not have ceased their fire, the most effective, and, at least we may imagine it to be so, the best-aimed, because they have a large object within a short distance and a good position under cover. What will the losses be like? To throw away the advantages which may be derived from accuracy of fire at such a distance is simply not to recognise but to discard all the benefits of the careful musketry instruction of our army.

Again the drill-book says—"The second (or assaulting) line will pass through the first line, which latter will immediately join the second line": but let us imagine the condition of the first line or rather of the firing line at this period of the fight. It will be a rank or line of intermingled men, in clumps or swarms as the Germans say; men of different sections will be *always* mixed up in it, *very often* of different companies, and sometimes of different battalions. The way in which units become intermingled in an attack was shown at Tel-el-kebir, where the Highland brigade, after capturing the Egyptian entrenchments, and without suffering any serious loss or meeting with any check, was dissolved into groups of men of different regiments assembled round the nearest officers. A portion of the leaders will have been stricken down, and those remaining alive to lead the men are not always the oldest and usually not the bravest, and yet such a swarm and conglomeration of men are supposed to cease fire, fix bayonets on a signal whistle, and to join in and aid the second line in their assault. When one imagines the terrible tension of the nerves from which the majority of men suffer when under a heavy fire, the probability is that such aid would be considerably more detrimental than useful, unless indeed in the manner described in the Russian regulations, in which it says—"The fighting line should be some paces in front of the reserve aiding the attack by a heavy independent fire." This fire ceases when within 50 yards of the objective point, when the fighting line closes in on its remaining leaders and joins the reserve in the assault.

To quote the drill-book once more.—"The second line, marching up in rear with drums beating and bugles sounding, should have bayonets fixed."

From this phrase we may presume that the second line is supposed to reach the firing line in what may practically be regarded as close order, or in other words a body of troops in line at one pace interval, but in the campaign of 1870-71, "The second line likewise, while moving under rifle fire, found its dissolution into skirmishers, or small groups where there was partial cover, imperative, as did the reserves which followed." However, enough of the drill-book. Let us see what some of our other military writers have to say about the attack of entrenchments. Lord Wolseley remarks. "No direct attack, whatever may be its strength, should ever succeed in turning a line of infantry out of a shelter trench, in front of which there is no cover within about 300 yards"; and again in speaking of the defence of a village he says—"The result of many a battle has turned upon the struggle for possession of a village, and such will be the case again in all wars. If the defence be ably and bravely conducted, the assailants' loss should be very great, no matter what may be the result; but if the village by its general plan,

Hamley.

position, surroundings, and the nature of its buildings, is one that lends itself naturally to a prolonged defence, the defenders have so many advantages on their side, that they should blush for shame, if they do not remain masters of it."

Some writers consider that modern artillery, from the great increase in its power, range, and accuracy (and when we look at our own 12 pr. we can see the enormous advance which has taken place since 1870-71), and from the effect on the spirits of the defenders which the terrible character of the converging fire from a large number of guns must have, is almost of itself nearly sufficient to induce troops to desert their post, especially when occupying a village instead of trenches; but when we remember the village of St. Privat, where hardly any entrenchments had been thrown up, surrounded as it was by a few low stone walls, and mud banks and hedges connecting it with St. Marie aux Chênes, and then of the fire brought to bear on it for hours by the Prussian artillery, commencing with 84 and ending with 210 guns, and later on of the fire poured by the still unshaken infantry of France on the Prussian guards during their advance, it seems that, as long as the soldier-like spirit of the defenders can be maintained, the advantage is all on their side, and that a heavy artillery fire, although it may aid the assailants' advance to a great extent, will never force really good troops, covered by even the slightest entrenchments, to abandon them.

Hamley.

"The fact that, any good position adequately occupied may now be considered certainly tenable against all front attacks until the strength of the defenders is exhausted and gives way before the assaults of fresh troops, renders certain modifications in tactics probable." The modification proposed is a great development of flank attacks, but of that hereafter; and in support of the assertion regarding the uselessness of frontal attacks on any good position, we may again instance the battle of 18th August 1870, where the 2nd French corps on the left of the position, occupying quarries and lines of shelter trenches on the slope of the hill across the ravine, opposite the village of Gravelotte, was attacked by two and then three German corps, and lost only 60 men killed, while the assailants suffered enormously.

Home.

Home.

"But when troops, armed with a breech-loader, are covered by trees, shelter-trenches, walls &c., the attack becomes far more dangerous, because the effective fire of troops acting on the offensive is seriously interfered with, the defenders' fire becomes at the same time all the more accurate and deadly, because they suffer but little from the attackers' bullets: consequently the attack on troops occupying a wood or village or an entrenchment requires a longer preparation and a greater quantity of artillery fire than if the defenders had no cover." And again, "But no fire, however heavy, well directed, and continuous will drive good troops out of a position. A heavy cross fire of musketry and artillery may shake the morale, and disorganise the defenders, may kill and wound many, may induce many of the less brave individuals to seek some excuse to leave the position, either by assisting wounded men to the rear, or otherwise, but still the men whose hearts are in the work, the really brave men, will remain to fight it out. So long as they have ammunition these men will hold their position, and it is only the actual advance of superior numbers that will finally compel them to retire."

This was written immediately after the war of 1870-71, but now-a-days, however long the preparation and however numerous the artillery, good troops under cover ought not to be driven out of their position during daylight. As the old saying has it, Providence is on the side of the big battalions; and superior numbers will always tell, but during the whole of our military history, the British army can seldom or never be said to have been blessed with the big battalions, and most of our battles have been won by that good old Anglo-Saxon attribute of sheer dogged pluck and obstinacy, in combination with Scotch stickiness, and Irish *élan* and forwardness.

Let us glance for a moment at the nature of the fire recommended or rather ordered to be used during the attack in our Infantry Drill. The book says "Volley firing should therefore be continued by attacking troops as long as possible. Independent firing should only be resorted to by the firing line immediately before the final charge, or when in close proximity to the enemy"; also "Volley firing should be used in the attack as long as possible, and as a rule it should be by sections. At long ranges the fire unit should generally be the half-company, in order to give the full effect which a concentration of fire produces; but a good volley can rarely be delivered by a larger unit than the section. Independent fire is difficult to control in the attack, and should be postponed as long as possible; when troops once begin independent firing, it is most difficult to induce them to rise with one impulse and dash at a firm enemy"; and again "Volley firing will be maintained during the development of the attack until the final stage is reached, and will as a rule be by sections; but when it is required to obtain the fullest effect of concentrated fire at long ranges, and after reinforcement by a support, half-company volleys may be employed."

From the above extracts it is very evident that volley firing by sections and half-companies is at the present time in high favour in our army; but what do we find was really the case in the war of 1870-71, and this is the only war from which any deductions regarding the nature of the fire to be used in an attack can be drawn? We may notice that after the war of 1866, the Germans still retained their faith in steady volleys delivered at short ranges, and continued to practise their delivery up to the beginning of the campaign of 1870-71; but they had not then fought against breechloaders, and now they confess that the breechloader has so increased the employment of skirmishers in action, that volleys can rarely be used, and we have but few properly recorded instances of volleys having been actually delivered. We have no mention of volleys at Weissenburg, where the peace training in this respect should still have retained its force, nor are there more than 3 or 4 properly verified instances throughout the subsequent actions of the campaign. When engaged with infantry, the Prussians also found it impossible to make the least use of company or section volleys, but what they did do was to reserve their fire for short ranges, seldom commencing the musketry fight until they had arrived within 600 or 700 yards of the enemy, and in one instance at Spicheren, we find a Prussian company fighting on the railway west of the Drathzug repulsing a French column moving by the side of the pond, by reserving their fire until it had approached to within 100 paces. Thus it would appear, that in war volley firing is only possible in the rarest and most exceptional cases, and as a general rule that there can be no such thing, and that a well conducted quick or skirmishing fire is the best to guarantee great results with the least loss.

With reference to the distance at which fire was opened, the drill-book agrees very nearly with the practice of the Prussians, as, excluding occasional long range volleys, fire is generally opened at about 800 yards from the position. "No battle has ever been won at long ranges, owing to the uncertainty of the fire and the feeling of security which the distance engendered." In fact, our recent experiences in Egypt all tend to discredit the employment of infantry fire over 500 yards. At Abu Klea independent firing was commenced but checked, only to be recommenced again with still more deadly and telling effect when the enemy had approached to within 300 yards. At Hasheen the advance was carried out without firing till near the summit, when a hot fire was commenced to prepare the way for the final rush.

As regards the position of the men firing, it seems as if the orders contained in the drill-book are difficult to carry out, and almost impracticable; it says, "The attitude of men firing affects the efficacy of their fire. On the defensive, when unprotected by entrenchments, or during the preparation for, or the first stage of the attack, the lying down position should be used, and also ordinarily during the advance. In the final stages of the attack, if the ground is flat and open, the firing line may lie down to fire after each rapid advance, but as a general rule fire should be delivered *kneeling* (or standing if a view of the enemy cannot otherwise be obtained). Men must *not then* be allowed to lie down or creep from place to place, as by so doing their fire becomes less effective; they lose offensive spirit, and in the attack are not readily induced to continue the advance." And again "The men may be directed to fire in any position at distances over 500 yards, after which as a general rule they will not be allowed to fire lying down."

This is much the same as saying, that the nearer we approach the enemy's position, and the further we advance into the zone of aimed infantry fire, the more our men are supposed to expose themselves to that fire. To teach anything in peace time is easy. In peace time a distance of 500 yards is passed over in a few minutes, in half-an-hour, but in war it will be crossed only in a few hours and sometimes only in a few days. To raise up a fighting line lying down under fire is admittedly not very easy, but the spirit of the men lying down is much better than that of the men standing or kneeling in the open. We shall never succeed in convincing the soldier that there is no great difference in the losses—whether he is lying down, or kneeling, or standing. It is quite possible to arouse in the soldier the impulse to move forward, but on halting to fire he will undoubtedly lie down through the feeling of self-preservation, which it is impossible to entirely eradicate. In close order we can obtain an automatic obedience, but in extended order this is not the case. In the latter the soldier during the first part of the advance is permitted to adapt himself to the ground, in the other not. What object can there be in firing kneeling or standing in the firing line? The chances are that the fire of both antagonists is not at all equal, one is almost invisible and his rifle is on a firm support, the other is in the open and visible and fires from his hand. Against whom is the latter firing? For some hundreds of paces he can only see the shelter trench or parapet, above which the defenders' heads are hardly visible, and when he does approach near enough for the heads to become more distinct, he has to expose himself more by kneeling instead of lying down.

No, the possibility of an open advance, under a close fire, with halts to fire kneeling or standing is impracticable in war, and as Lord Wolseley says "Infantry should when stationary always lie down, both for the purpose of concealment and of shelter from fire." When the soldier is halted, he should be allowed to select the most comfortable and also the best position for firing, *i. e.* lying down; firstly, in order to enable him to take a steady aim at his object; secondly, in order to calm his nerves under fire, especially if momentarily it is impossible for him to fire himself; and thirdly in order to diminish loss. The principal advantage on the side of the defender is that he suffers but little from fire, but causes considerable loss to the assailant: it is in "retreating under the fire of the victors, that the beaten troops pay the full penalty of defeat."

Why is it that the attack on any entrenched position is as a rule unsuccessful? From the annihilating losses, which exert a pernicious influence on the morale of the troops; the men lose heart, appear doubtful of success, the panic spreads, and disaster results.

General Kuropatkin, writing about the Russian mistakes at Plevna, says—"If enormous losses, physical exhaustion, and nervous agitation, forced the assailants to halt, before reaching the object of attack, they halted, not where it was advantageous either from the nature of the ground, or from their distance from the enemy, but wherever the crisis occurred to them. Some portions halted at 1000 paces from the enemy, and others at 40, and sometimes they halted on an open plain, when both before and behind them was excellent cover." Such will be the fate of British soldiers, if they have to kneel or stand when advancing to the attack within a distance of 500 yards from the enemy. The firing line also, instead of advancing by rushes, will often be obliged not to double, but to crawl and creep from place to place.

We have somewhat strayed from our subject, so let us return to the question of the attack of entrenchments. It may be taken for granted that in the future any fairly good position, where flanks are secure, and whose front is defended by entrenchments of some sort or other, may be regarded as impregnable to a frontal attack by daylight; and unless the assailants themselves make use of entrenchments, and advance slowly towards their objective, covering their fighting line with what may almost be regarded as a modified form of siege-works, the defenders' troops, if worth their salt, should hold the position against any attack that may be directed against it, even when accompanied by a great superiority of force, unless in the latter case, as mentioned hereafter, large turning movements are brought into play.

However, positions both of whose flanks are secure are the exception and not the rule; if one flank rests on some impassable obstacle, the other will generally be *en l'air* and therefore liable to be turned, and the defenders forced to retreat by means of a well delivered flank attack; and when there is a great superiority of force on the part of the assailant, the defender wlll often be obliged to retire, if he wishes to preserve his army from destruction, without firing a shot.

A frontal attack, even when aided by small flank attacks, being in the present day almost synonymous with severe defeat, it seems that there are but three methods, by which an enemy can be driven out or forced to abandon a position, where he has had time, or where, through the supineness of the assailant, time has been allowed him to throw up shelter trenches or breastworks, and to place villages, woods &c., in a state of defence, or even to strengthen the salient points of his position. In this respect, the war of 1870-71 teaches us little or nothing. The history of the victories of that campaign is,

Hamley.

" That the German corps march straight for the enemy, that the leading troops at once attack, that the rest hurry up to their support, extending and deepening the skirmishing line, and that after a severe engagement, an extension beyond a flank renders the position untenable. There is none of the higher manœuvring, which aims at an advantage by deceiving and perplexing the enemy, no feint to retain him on one point, while the decisive attack is prepared elsewhere. All is sheer straightforward fighting, successful because of the discipline, and training, and spirit of the units, and in the end, because of the weight of numbers. Even where circumstances would already seem to indicate that the real effort must be made elsewhere, troops are nevertheless sent on in an indiscriminate assault. Thus the German right at Gravelotte was separated by a ravine from the French left; it rested on the Moselle, and the French could only advance on that bank by forcing the Germans back; the decisive attack was to be made by the German left; the ground was excellent for defence, bad for offence; all good reasons for the avoidance of unnecessary slaughter and risk of defeat, by slighty engaging or even refusing that wing of the German army. Yet the corps there were hurried to the attack no less earnestly than at other parts of the position, suffering enormous losses, in peril, indeed, of defeat, till supported by the 2nd corps from Pont-à-Mousson, and inflicting only the most trifling damage on the opposing corps, which did not withdraw till next day."

Of the three methods in question, the first, implying great superiority in numbers may be briefly described as leaving a part of your force entrenched in front of the enemy's position and making a large turning movement with the other portion, or in other words of "dislodging an army by operating with a detachment against its rear." As one and by far the best example of such an operation, we may instance Sherman's campaign in Georgia in 1864, a campaign well worth studying in the present day, as it seems to contain the key note to that close combination of strategy and tactics, which in all probability will be one of the chief distinguishing characteristics of the next great war, and which for want of a better term, we may call strategical tactics.

Sherman, commanding the Federal forces, had from 90,000 to 100,000 men, and Johnston, the Confederate general, 40,000, afterwards reinforced to 50,000 men. His object was to obstruct Sherman as much as possible, and to cover Atlanta to the last moment.

Hamley.

"Except in attacking the Kensaw mountain on the 27th June, the character of Sherman's operations was throughout the same. To protect his main line from a counter attack, he left a force entrenched across it. He then reinforced his flanking wing to a strength sufficient to cope with the whole army of the enemy, and directed it by a circuit off the main line, upon the Confederate rear. In every case the operation was successful, obliging Johnston forthwith to abandon his strongest positions, and to retreat.

If, as in Sherman's case, the enemy is so strongly posted as to render a front attack on him inexpedient, there will be no other course than to detach a force to turn the position. And if the assailant also possesses a strong position on the main line, it will be best to reinforce the flanking wing, till it is equal to the whole numbers which the enemy can possibly bring on that side, and order it not to halt until it has attained the point aimed at; holding meanwhile the aforesaid position with the rest of the army. Should the enemy detach a part only of his forces to meet this attack in his flank or rear, he will be beaten. Should he meet it with his whole army, he abandons the position in which his strength lay"

Sherman, in his letter to Hamley published by the latter, puts the whole matter in a nutshell, "Though I divided my force (generally, but by no means always, a violation of a rule of war), Johnston could not have fallen on Macpherson without doing just what I wanted—*viz.* letting go forts and parapets, and a natural position from which it might have cost me 20,000 men to have dislodged him by a direct attack. Johnston could not make a detachment large enough to endanger Macpherson, who on the defensive would have had the woods and range of hills at Snake Creek in his favor, and I had good roads by the rear to reinforce Macpherson in one march."

The second method under consideration is a modification of the former, in that it is a combination of a flank with a frontal attack, the former being the chief attack, and the latter only intended to hold back and occupy the enemy, while a turning movement is being effected. The Germans in 1870-71 combined both a frontal and flank attack almost invariably, but the troops engaged in the former were urged forward up to the very position of the enemy with a terrible and useless sacrifice of life, as witness the frontal attack at Woerth, and in all the subsequent actions of the campaign.

Hamley.

Now-a-days it is generally admitted that "on the offensive, points may be seized and held in an intended position, or line of battle, by advanced troops, if sure of support, in presence of very superior forces: part of a force may, with increased security, be left in front of a strongly occupied position, while a turning movement is made by the rest of the army." The firing line advancing, as laid down in the drill-book up to within, say 500 yards more or less of the enemy's position, according to the nature of the terrain, should from that distance keep up as hot a fire as possible on the enemy. We may presume that by the time the firing line has arrived within 500 yards of the enemy, the supports would have already reinforced. The battalion reserves in rear should continue their advance in extended order, and, approaching as near as possible without suffering severe loss to the firing line, should proceed to construct shelter-trenches, breast-works &c., as rapidly as possible. It is useless shutting our eyes to the fact that we shall be obliged to have recourse to this, and that in all probability the next great war will see an enormous development of the use of entrenchments on the offensive. When ready, the reserves would occupy these trenches, and the firing line, which has not yet been so completely committed to the fight, as to be incapable of being withdrawn from it, gradually retiring, would either join the battalion reserves in the trenches, or, proceeding still farther to the rear, would itself form the battalion reserves according to circumstances. The assailant might provide for the defence of an exexposed flank by works thrown back in echelon, and might station his strongest reserve (in this frontal attack) there, for in the present day, owing to the great extension of the front of modern armies, we may take it for granted that, in addition to one main reserve, there will be numerous small army corps and divisional reserves as well. Of course it is by no means meant that this part of the assailants' force should be limited to a purely defensive action; on the contrary it should combine both defensive and offensive action, or, as the drill-book has it, "in such formation as will admit of its being readily converted at will into the main effort;" and the second and third lines should be ready to move forward at any moment, and make a dash at that portion of the enemy's position, which he may have weakened, or whose fire has been subdued. Even a threatening advance beyond the line of shelter-trenches will in all probability be sufficient to induce the defender to retain many more troops than necessary to resist a frontal attack, and thus the number of his troops available to repel the flank attack of the assailants will be diminished.

When we consider the difficulties which will confront the assailant in the warfare of the future, through the smokeless powder rendering him more or less visible to the defender throughout the whole of his advance according to the accidents of the ground; and also the fire from the magazine rifle which will be poured in during that last 150 yards while the assailants are doubling across for the bayonet assault; and also the fire that can be kept up by the assailants at a distance of 500 or 600 yards from the defenders' position, it seems that such a method would be equally as effective in holding fast the enemy, as the senseless German method in 1870-71 of a huge and useless sacrifice of men's lives. Moreover we must also bear in mind that as our army in a great war is almost certain to be weaker in numbers than the enemy, we cannot afford to sacrifice our troops needlessly and must spare our men by every means possible.

Infantry Drill.

The flank attack itself must be composed of the greater portion of the assailants' troops and "in deciding the strength to be employed, it must be borne in mind, that whatever attack is determined upon should be made with a force amply sufficient to give a reasonable hope of success."

Of course every flank attack becomes locally a frontal attack, but in all probability, unless the defenders have been some time in the position, the flanks will not have been so well secured by entrenchments as the front, and thus less opposition will be encountered. In 1870-71 flank attacks were almost invariably resorted to, and it was generally found that the sudden appearance of a comparatively small body of troops, who opened fire on the flank and rear of the line, was sufficient to produce dismay and rout. "In future, owing to the long range of all arms, attacks upon the centre must be very exceptional, the flanks will be the points to aim at." But this second method also implies a certain superiority of numbers.

The third, and, in the present day, the best of all ways to drive an enemy from his entrenchments is undoubtedly a night attack, a method of attack which above all others demands the very highest discipline and training, and strictest obedience to orders.

Wolseley.

"The precision and rapidity of rifle fire is now so great, that, to attack any well selected and well defended position by daylight is to run the risk of being swept away, as the Prussian Guard was in its attack on the 18th August 1870. The destructive nature of aimed rifle fire is so great, that I believe the army that will first be able to manœuvre at night will achieve brilliant victories."

Under the heading of a night attack, we include those attacks at break of day, the preparations for which have been made under cover of night, and in many of our recent little wars such attacks have often proved signally successful.

The assault at Tel-el-kebir completely surprised the Egyptians, and the result was greatly due to the careful way in which the habits of the enemy had been studied before the preparations for the attack were made. The Egyptian works were carefully reconnoitred and watched, and it was remarked that their picquets, sentries, and vedettes were only pushed out to a distance from the entrenchments after day-break. "Scarcely less remarkable in the decisive character of the results obtained, was the movement by which General Sir F. Roberts brought his main column of attack on the Afghan flank, the night previous to the assault of the Peiwar Kotal." At Giniss also all our preparations were made during the night, and the assault delivered at dawn.

Prize Essay.

As an example of a purely night attack, we may instance the one on Morosi's mountain in South Africa, where the assault was made in the middle of the night over most difficult ground. The Kaffirs were sursurprised and a brilliant success gained.

At Tel-el-Kebir every possible precaution was taken. On September 12th, the day preceeding the fight, Lord Wolseley had taken out all officers commanding divisions and brigades, as also all heads of departments, on to the ground between the two camps, and had there carefully explained to them the nature of the movement and the disposition of the troops. The direction of the enemy's works, and the stars to guide the army towards them were pointed out, and it was also arranged that posts marking the direction of the enemy should be set up after nightfall. During the advance connecting files were interposed between brigade and brigade both laterally and to the rear. Staff officers were continually sent from point to point during the advance, but in spite of all these precautions, and of the fact that the force was moving over an open plain, the hazardous nature of such a movement was well illustrated "by the wheel inwards of the Highland brigade, owing to an order to halt having reached the companies in the centre, while the outer flanks remained in ignorance and pressed on. The mistake was discovered betimes, but 25 minutes elapsed before the brigade could resume its march."

Prize Essay.

As an instance of the disorder attending a night march in retreat, even when not pursued by the enemy, the retreat from Dewangiri in Bhootan is a striking example.

"The main column lost its way, the perils of the route through the hills produced a panic, some of the wounded were left behind in the confusion, the abandoned guns were pushed over the precipices in hope of saving them from capture, and the force arrived at its destination in a complete state of demoralization."

Prize Essay.

As regards the formation to be assumed for a night attack, the drill-book describes it well in a few short sentences, "In order to ensure simplicity, the columns of attack should be as few and as little subdivided as practicable. When the mounted arms of the service are employed, they will all always be well separated from the infantry, and well in rear of it. It can seldom be right to dispense with a support, and a strong reserve, but they should be kept at a sufficient distance from the attacking troops, so as not to be carried away by the confusion which any unfortunate panic might inflict upon those in front. It is desirable that the different columns should be kept in communication as long as possible: the simpler the plan of attack the better: ruses are apt to lead to confusion, though false attacks are often very useful." And again, "The attacking column at from 50 to 100 yards distance from the advanced guard will be in column of companies, half-companies, or sections (or in fours), with the ranks at three paces distance, and the files at one side pace interval, according to the nature of the route followed."

The mode of advancing to the assault during a night attack is well described in the following extract: "The attacking troops should, as a rule, not fire a shot: their work must be done with the bayonet: a steady advance in silence up to charging distance, and then the loudest of cheers, all drums beating and bugles sounding. Unless the enemy is covered by some serious obstacle, in nine times out of ten, his men will break and bolt, shooting one another, blocking up roads and preventing the escape of guns" &c., &c.

Wolseley.

The words "according to ground and according to circumstances" should precede or follow every military regulation or every attempt at military discussion, for experience and study of war can alone decide many points, and enable a man to act rightly under certain given circumstances.

Theory is, in other words, the experience of others, and we must always remember that there are no such things as fixed rules in war.

We cannot say that such a formation is right and such another wrong, or that one sort of fire should be used under one set of circumstances, and another sort under another set.

"When attempts are made to lay down principles in war, a large number of officers at once solve the problems, by saying *everything* depends on circumstances. As the wind blows, so must the sails be set. But if the proper sail, and the proper amount of sail suitable to each wind, is not known beforehand, how can sail be made at all?"

Bugeaud.

Finis is a word that has yet to be written in the art of war.

ON THE INFLUENCE OF THE NEW TECHNICAL MILITARY INVENTIONS ON MODERN WAR.

INTRODUCTION.

The following translations of an article from the "*Republique Francaise*" by General Tricoche and of one from the Russian "*Military Magazine*" by M. Velichko on the influence of the new technical military inventions on modern war may be of interest to some of the readers of the Journal.

The articles cover but a small part of the question. Many will differ from General Tricoche both as regards his deduction in favour of artillery and his anticipation that future wars will be shorter than former ones. In treating of his own arm, artillery, he seems to have overlooked the extreme danger the personnel will be subject to from infantry fire. In his general conclusions he is in direct opposition to the opinions lately expressed by Marshal von Moltke. While nearly all the new inventions tactically favour the defensive, modern strategy is in favour of the offensive. General Tricoche has not considered the influence of the national character of the struggle in a modern European war nor the fact that the necessity for supplying modern armies has rendered railways indispensable, which is very likely to impart to fortresses governing important points of passage an importance they have not had since Marlborough's wars.

The uncertainty of the duration of a modern campaign is further enhanced by the fact that there is no example of modern fortress warfare for our guidance.

M. Velichko's article would be better named "Balloons and portable watch towers as a counterpoise to smokeless and noiseless powder."

C. M. MAGUIRE.

Translation of an article from the "Republique Francaise."

All the armies of Europe are now considering the conditions under which future wars will be commenced and waged.

It is certain that during the last twenty years science has brought about a complete revolution in the mechanical appliances of warfare. It is necessary to inquire whether this will not be attended by a corresponding alteration in tactics.

The development of telegraphs, and railways, the progress of balooning, the invention of explosives of extraordinary power, the increase in the range and effect of small-arms, the mathematical precision of artillery fire, and, finally, smokeless powder, are so many new, and important factors in the already so complex proplem of a war between large forces.

What will be the precise influence exercised by each of these results? It is difficult at present to give an accurate answer to this question. This is apparent if we consider the strange views and wild proposals that have been published on the subject by the European press.

There seems to be an undue haste in solving the enigma of a new and terrible problem. There is an eagerness to get rid of these menacing novelties.

Some are above measure alarmed by the new inventions, while others regard them with an unreasonable contempt; both sides run into extremes.

The improvements which have been introduced in the technical equipment of armies should be regarded neither with fear nor indifference; they should be applied as judiciously as possible to the tactics of modern engagements. I recognise this to be a difficult study which cannot result in the discovering of positive rules because it lacks a necessary condition of primary importance,—the experience of the battle-field. However, though there are some unknown elements affecting the changes that must take place in tactics which cannot be determined in the absence of experience, there are others more accessible to our investigation.

Those who have had experience in war are able without great difficulty to arrive at any rate at an approximate idea of the probable character of future conflicts. Their memories are still sufficiently vivid to enable them to appreciate, if not the precise results of these inventions, at least their probable consequences, and to deduce from them the new rules which should be adopted. For instance, though it is impossible to ascertain positively the effect that will be produced on a line of skirmishers by the absence of smoke, we can by having recourse to memory picture to ourselves the advance of a line under similar circumstances during past campaigns, and thence form a fairly accurate conclusion as to what would have happened had the smoke suddenly, completely disappeared from the battle-field, and thus determine the rules to be followed in this particular instance.

Certainly such rules must have a somewhat conjectural character, but we may presume that they will not differ much from those which the experience of previous wars will suggest.

It is doubtless on this presumption, and with a wish to determine definitely the conditions which effect certain portions of this great question, that the Governor of Paris has had recourse lately to special experiments. I was not present at these experiments, nor do I know of any information on the subject except what can be drawn from the newspaper reports. In my opinion it is better to leave the record of practical studies of this sort in the vague form of newspaper reports. This is especially the case with reference to views on smokeless powder. The new powder is for the time being the principal object of attention in military circles, not only in this country but also abroad. M. Moch, captain of artillery, is about to publish at Berger Levrault's a complete and interesting study on the subject. He says that he has consulted the most important publications that have appeared in France and elsewhere on the relation between smokeless powder and tactics, and he mentions twelve of these *brochures*, namely, three French, seven German, one Swiss, and one Italian. The authors of these numerous articles do not agree as to the tactical results that will proceed from the use of the new powder; while some maintain that it makes no difference in Europe except the addition of another powder, others consider that the introduction of smokeless powder has affected a complete revolution in the art of war.

What is certain is, that smoke is a great assistance to the General in chief command.

When there is no smoke, and the rattle of musketry is inaudible at great distances, and the weakened reports of artillery are accompanied by no indications as to the whereabouts of the guns, the Commander-in-Chief will often find himself in uncertainty. This is an undeniable fact to which our Generals may well devote their attention. On the other hand the command of small units should apparently be rendered easier by the clearness of the atmosphere. Has not the firing line hitherto been rather interfered with than protected by smoke? Will not the Captain under the new conditions have his men better in hand?

Then we shall be told of the striking colour of our uniform! Have we had to wait till now to find out that red is a striking colour? Has it not been proposed quite recently that our kepi and red trousers should be covered with grey cloth. It may be remarked '*en passant*' that this would be a singular manner in which to strengthen the morale of our infantry soldiers. At the same time it is announced that the Germans are thinking of giving up the helmet and adopting our kepi just when we ourselves are on the look out for a helmet. Has the new powder rendered these two great nations so silly as to change their head-dresses? In my opinion it would on the contrary be wise on our part to render the cherry-coloured trousers universal in our army, and to give our troops a national uniform entirely distinct from that of foreign armies in order to avoid dangerous mistakes.

I had occasion myself during the campaign of 1870 to deplore the loss of a number of men in the company which served as an escort to my artillery, occasioned by a mistake of this nature. The captain mistook some Prussian infantry for French chasseurs-a-pied, and allowed them to approach unmolested until a severe fire showed him his mistake.

It would no doubt be desirable that the personnel and materiel of an army should be rendered invisible, but the attainment of this appears chimerical. I have personally made many experiments in this direction and have arrived at the conclusion that the presence of troops is always betrayed in some way in spite of the most elaborate precautions.

It has been stated that, at General Saussieri's review on a cloudy day, infantry were more clearly discernible at a distance than chasseurs a pied and artillery.

As to facilities for taking aim, every one knows that they have only a secondary importance, as the infantry soldier only takes aim under very exceptional circumstances. Let us then abandon these foolish discussions, the most apparent result of which would be a prejudicial influence on the morale of our infantry.

Will cavalry also be inconvenienced by the absence of smoke? I am inclined to think that in this respect too views have a tendency to run to extremes. No doubt smoke is always a valuable guide, but the cavalry soldier while reconnoitring has no need to see the infantry soldier, the whistle of whose bullet serves to indicate his presence. His attention would thus be put on the alert, so it would serve as a guide to enable him to perform his mission.

Cavalry charges are spoken of as prepared under the protection of smoke: this is hardly a view that would be supported by those who have seen actual war.

[General Tricoche seems to evade the question by putting it as he does. No doubt cavalry charges are not prepared under the protection of smoke; still the smoke of firing infantry interferes with their view and renders them liable to be taken by surprise. A smokeless battle-field will cause the movements of the cavalry to be more carefully observed than heretofore, and thus render its interference more difficult.]

As far as artillery is concerned the disappearance of smoke is a fact of great importance. The cloud of smoke which covers the front of the batteries after the first few shots is at once a hindrance in the way of finding the range, and an objective for the hostile artillery.*

When this veil no longer exists it will no doubt be more difficult to ascertain the exact position of the enemy's guns, but this drawback will be compensated for to a great extent by the incomparable advantage of a complete view of all points of the battle-field during the action, which will facilitate finding the range and changing the target; artillery will thus acquire an increased importance. Its deadly projectiles will fall in succession, with fatal precision, on the different points on the field, and its power will have no other curb than the opposing artillery. Thus it can be said more positively than ever that, whichever of the opposing artilleries finds the range more quickly and thus gains a superiority of fire, will become absolute mistress of the combat.

So that if it be asked what seems to have resulted from all the progress which has taken place up to now in the act of mutual destruction, I should answer that in my opinion we must henceforward expect more deadly but less prolonged struggles than heretofore. War will not in future be more than a brief and terrible convulsion in the life of nations. Indeed who knows whether after a succession of struggles, more and more severe, it may not in the end disappear?

GENERAL TRICOCHE.

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* The author does not allow for the protection afforded by the smoke against artillery in concealing the effects of the enemy's sighting shots, and against infantry in protecting the personnel in the later stages of the fight.

SMOKELESS POWDER AND BALLOONS.

Translated from the Russian,

BY CAPTAIN C. M. MAGUIRE, *2nd Lancers, Hyderabad Contingent.*

The military world had hardly succeeded in accustoming itself to the new magazine rifle, and the powerful effect of the shells charged with the new explosives, and the significance to be attached to high angle fire which will now be present on the battle-field had hardly been recognised, when the appearance of a new factor in the military problem, a smokeless and to a great extent noiseless powder, created a sensation in no way inferior to that produced by the other inventions referred to. The incessant improvements which take place in the appliances of war must, by their gradual increase, render the conditions of future campaigns very different from those which governed that of 1870-71 or even that of 1877-78. In considering the inventions and improvements in offensive arms, it is impossible to overlook the peculiarity they all share, *viz.* their conspicuous simplicity of design, ease of execution, and convenience of application. The calibre of a rifle is changed, a magazine fitted on, and the improvement is complete. A mortar is placed on a wheeled carriage instead of a stand, and high angle fire is at the disposal of field troops. A shell is charged with pyroxaline or melanite instead of powder, a sensitive percussion fuse is attached to it, and the mighty thickness of the plates of an armoured turret does not protect its guns and mechanism from the action of the subtle shell mines, nor those serving the guns from the poisonous results of their explosion. Finally the composition of gun and rifle powder is so changed that their discharge is accompanied by little noise and hardly any smoke.

These improvements in offensive weapons, while exercising a great influence on the different branches of the domain of war, do so especially on tactical tenets, and on the means of combating the new armament proposed by engineering art.

A report as to the adoption of a new invention which appears in the newspapers excites the whole military world, and may constitute a theme of more than ephemeral interest, remaining for years a subject of which the pros and cons will be discussed by the press, until the experience of actual war places it beyond the sphere of theoretical discussion. It is an advantage that in our days the political relations of states to one another are such, that from fifteen to twenty years of peace are available for a complete preparation for war, and for estimating accurately the characteristics of any important new military invention and its consequences.

As far as we soldiers (who are not specialists in the art of manufacturing powder) are concerned, the nature and composition of the new powder is immaterial. We are, however, concerned to know whether it actually gives no smoke at all or only a little, and also how far the report of guns or rifles firing it is audible or inaudible; as a scarcely perceptible smoke and an almost inaudible report render the eyes and ears at some distance off incapable of determining the enemy's whereabouts. Finally, it is necessary to consider whether the use of the existing examples of the new powder, though not perfectly void of smoke and sound, will serve for the mutual annihilation of two opposing forces, as no doubt the manifest advantages of the new powder will in time lead to the appearance of a perfectly smokeless and noiseless form of it. We should therefore take advantage of the present period of peace to study the consequences which will result from the introduction of the new powder. These promise even now to be so numerous that, though the subject has received considerable attention from the press, there are still some points with reference to it that have not been touched on, which may be of general interest.

Any new military invention only confers the greatest possible benefits on one of two opposing forces, when the other has not succeeded in adopting it. Consequently in a war with barbarous nations who are unable to obtain the appliances or adopt the organisation of the armies of civilised nations in due time, the latter always prevail. This would in all probability also be the case in a war between two European powers in which one was armed with magazine rifles, field mortars, smokeless powder, shells charged with the new explosives, field watch towers, balloons, &c., while the other commenced the campaign under the conditions which would have been regarded as normal ten years ago

But however destructive and terrible in its proposed effects any such modern invention may be, it loses much of its significance when it is at the disposal of both the contending parties. Consequently, the best means for opposing, or, more accurately speaking, of paralysing, those advantages which the possession of a new invention confers on one side, will be its adoption by the other. If the enemy is armed with long ranging accurate rifles taking small charges; if mortars form part of his field artillery; if he fires smokeless and noiseless powders, and carries out his observations from balloons, it is certainly necessary to have the same appliances or if possible better ones to oppose to him.

It has always been recognised that one of the principal means of getting on even terms with an enemy is to fight him with his own weapons. But contending with the enemy on even terms would not in itself be sufficient to confer the probability of victory to one side. It is further necessary to investigate thoroughly the best means of taking advantage of the improvements referred to, and thus anticipating or preventing the enemy from obtaining the same results.

Each invention in the art of war has its advantages and drawbacks. It is necessary to take advantage of the latter in order to create an obstacle for the opponent, so that they may be more especially unfavourable to him, and thus turn them to our benefit.

Regarded from this point of view smokeless and noiseless powder does not appear to be an exception to the other new inventions, and therefore it cannot be as dangerous as it was at first represented to be; and though the position of a soldier of the last century armed with a musket, opposed to a soldier of our own times armed with a small calibre magazine rifle, would be unenviable, yet in the next European war, when both sides commence with the same smokeless powder, it will have little influence on the chances of victory for either side. These chances will, just as before, depend upon the entirely different causes which led to the victories of Hannibal, Alexander, Julius Cæsar, Frederick, Napoleon, and other famous leaders, whose armies fought with weapons that appear ridiculous in their inferiority when compared with the present ones, notwithstanding which the leaders, who have been mentioned are even now our great instructors in the art of war.

Thus we shall assume that both contending parties will make use of the new powder. Let us now consider the advantages and defects of the new ammunition from the tactical and technical points of view, both for field and fortress warfare, and the measures by which we may reduce its drawbacks, and make the fullest use of its advantages.

Every technical improvement in the art of war is intended to further the following ends.

1*st.* The provision of complete means for defeating the enemy.

2*nd.*—To render it difficult for the enemy to make a successful use of the invention.

The new powder enables a more complete defeat to be inflicted on an opponent as:—

(1).—In artillery fire, especially from a mass of guns, smoke will no longer overspread a battery and interfere with its aim; hence the fire will become more rapid and more accurate.

(2).—Owing to the same reasons, the flanking batteries for the defence of the ditches of permanent fortresses will have full view in the ditches, in which at present gun-powder smoke so easily accumulates and remains, especially in the neighbourhood of flanking buildings, behind the counterscarp wall, and in the sallyports. This great defect in the existing dispositions for fortress defence may now be regarded as obviated.

(3).—In rapid artillery fire or salvos the noise of the discharge has hitherto drowned the voice of the commander and prevented a quiet direction of the fire, and the execution of orders without an intermediary. This inconvenience will not exist with noiseless powder.

(4).—Ordinary powder smoke, even in the case of fire from an open battery, irritates the eyes, throat, and nose, with its viscous clouds, and in the case of fire from casemates renders a sojourn in them extremely disagreeable, necessitating the use of the well known appliances for a vigorous ventilation of the casemates, which are insufficient during a rapid fire. In this respect the new powder effects a great improvement in the situation of an artillery soldier serving his gun. It also renders it possible to simplify the construction of casemates, as ventilation will no longer be necessary. Thus there will be one less opening in the casemate, which will increase its durability and cause it to offer a greater resistance to bombardment.

(5).—In the case of infantry the introduction of the new powder is accompanied by the same favourable conditions for fire as were pointed out in the preceding paragraphs. It is only necessary to add that, in the defences of fortifications, the series of vollies discharged during the last moments of a storm are accompanied by such clouds of smoke, that the assailants' movements are completely concealed from the defenders.*

As this smoke will no longer be present the new powder favours the defensive.

The appearance of smokeless powder could not have been more opportune than in these days of machine and quick firing smallarms.

(6).—If an enemy's battery in action, or a firing line, is the target of our battery, the smoke covering them protects them from destruction, as it conceals the place where the shells fall from observation (even from balloons), and thus increases the difficulty of aiming. When the new powder is used, the targets will not be masked by smoke, so they will be more easily destroyed.

Such are the direct advantages attendant on the use of smokeless and noiseless powder, but the following indirect advantages consequent on its use should cause great difficulty to an opponent, and thus add fresh advantages to one side.

(1).—A battery or firing line in action usually betrays its presence by the noise and smoke caused by its action, which enables an enemy not only to estimate the number of guns, the strength of the firing line, and the extent of the position occupied by them, but affords also very reliable data upon which to determine the whereabouts of the battery or firing detachment, which facilitates taking the range and selecting the target. In fact powder smoke favours the observation of the enemy in general, and fire in particular. Consequently, when firing the new powder, our batteries and personnel, will themselves suffer less than heretofore from the enemy's fire, and the general dispositions for a battle will be better concealed.

(2).—The batteries or firing line of the enemy can make use of their smoke as a mask to enable them to change their original positions, moving forty or fifty yards backwards or forwards or to one side, thus compelling a fresh aim to be taken at them without however losing the range they have themselves found. If the enemy fires smokeless powder he loses this advantage, and as all such changes of position would take place openly, they would have no raison d'être.

The advantages of the new powder pointed out in the first paragraph have an especial significance both in field and fortress warfare, particularly in the artillery duel. With reference to the possibility of seeing the target. In order to direct an efficient artillery or small arm fire on an enemy, it is indispensable to see the target or at least to observe the results of the fire. It is true that the bombardment of an unseen object, attended by certain favourable conditions, has become the usual task of the present improved artillery, but when mention is made of an unseen object it is not always added "unseen from the battery, but visible from some other point situated more or less near the battery." Meanwhile the matter stands thus, that the target must be seen from some point, as, if not, it can only be hit by firing by plan or in other words at random.

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* The Revue du cercle Militaire in an article on "The employment of artificial clouds in war" considers in detail the means for producing artificial clouds of smoke from various combustile materials, and demonstrates the value of such masses to an assailant who cannot have recourse to other cover.

Major-General Kirpicheff, writing on the subject of breaching escarp walls (an unseen object), points out that it is necessary to go up close in order to observe. It is possible to bombard from a distance, but one must be near to observe. The Bavarian General Zauer has expressed his conviction that, in dealing with long-ranging weapons, the principal object to be fulfilled is to see without being seen.

But if it is impossible to find a point from whence to view the target, not only owing to local conditions, but on account of deficiency of time, which is not always at our disposal especially during active operations, how are the whereabouts of the target to be ascertained, and the enemy's guns in action silenced? The only means the artillerist has for this purpose is that the intersection from two different stations of the clouds of smoke which appear above the enemy's position will approximately define the distance to the gun, and its distance from the covering body, or mask. Powder smoke has thus often proved only a fictitious mask, as it is impossible to prevent its rising, while its concealment is only practicable among very high trees. As a gun firing the new powder does not betray its presence by smoke, the artillerist is deprived of his last resource for determining the position of the target.

The importance of screening artillery in war is recognised, especially when it makes use of the screen to change its position unperceived, and thus disturbes the enemy's aim by constantly avoiding the zone fired on by his artillery.

There is no doubt but that smokeless powder affords the best screen to guns, as at considerable distances neither smoke nor guns are visible.

But the conditions set forth above as governing the relation of the new powder to the field and fortress warfare of the future do not exhaust its influence, which enters into the very secret corners of battle tactics, both in relation to the direction of the fire and the leading of the troops. Its influence also extends to outpost service, reconnaissances, ambuscades, and forlorn hopes.

We shall first consider briefly the special peculiarities of outpost services, which appear most striking in connexion with the use of the new powder. Cavalry or infantry piquets usually stand some five or six hundred paces apart. The distance of the support from the line of piquets is as much as 1000 paces, while the main body is about 1000 paces in rear of the support. The rules for outpost service lay down signals for the transmission of information from piquet to piquet and to the supports, but in important cases they recommend that a volley should be fired, which would certainly raise a simultaneous alarm along the whole line. It is true that a volley should only be fired "in case of extremity," notwithstanding that sentries often fire on the slightest suspicion of danger and raise false alarms. When a noiseless or nearly noiseless powder is used, such alarm will become rarer and in no case will they be general. But this advantage will be counterbalanced by the fact that the position of the piquets when the new powder is used will become very difficult. Their vigilance must be strained to the utmost, as the enemy will not betray his presence when he shoots. A sentry may be killed by an enemy's bullet, of which his comrade will probably only hear the whistle. There will be no indication as to who fired the bullet and whence it came. In such a case the morale of the piquet will suffer, men will be more nervous when on duty, and consequently there will be more frequent false alarms. But the whistling of bullets increases. alarm spreads from the the supports to the reserves, and the the latter hasten to the rescue, but it is impossible to determine the strength of the enemy or the precise direction of his advance. Besides the hanging musketry fire is not audible on the position, and the necessary measures are not taken by the main body until the arrival of a messenger from the reserve of the outposts. In such circumstances it would be easy to be taken by surprise. However calm and collected a piquet sentry might be, on hearing the whistle of a bullet, he might consider it as coming either from one side or behind, imagine an ambuscade or turning movement, and fall back on his piquet, unnecessarily abandoning his post. In short the mysterious aspect of noiseless war and an invisible enemy cannot but have a prejudicial effect on the efficiency of sentries, and must increase the difficulty of precautionary service, which is even now considered particularly severe, and demands large forces, as the use of the new powder will necessitate the devotion of a much larger force than heretofore to the preservation of safety.

As far as minor operations, including ambushes and forlorn hopes, are concerned, if it be considered that a great part of their success depends on concealment and the preservation of perfect silence, the new powder must be recognised as especially favourable to such operations.

What then will become of the much talked of movement when the vollies commence? With the new powder nothing except hoarse cries of hurrah, the clash of arms, the tramping of horses, and clouds of dust will betray the scene of the battle; while there will be no means of following the course of the engagement which has hitherto been apparent from the greater or less density of the smoke, while the thunder of the guns and the rattle of the musketry has been heard for miles. With reference to this last point, it is interesting to follow the different phases of the actions at Schipka, Sheynoff. and Imetti on the famous 26th, 27th and 28th December 1877, episodes so graphically described in General Kouropatkin's article "General Skobeleff's detachment's passage of the Balkans."

General Skobeleff could not obtain early information of what was going on in Prince Mirski's column, and vice versâ. On the 27th the left column had a severe engagement with the enemy at Sheynoff, while Prince Mirski knew nothing definite as to the movements of the right column. "At about 11 A.M., on December 28th intelligence was received that Skobeleff was near, but even without this late intelligence" writes general Kouropatkin "the approach of our troops from the Imetti direction would have been known from the increasing roar of gun and rifle fire resounding on the western side of the camp. Although we could not see the troops of the right column we knew that it was fighting hard." Page 212.

According to Colonel Raaben (the chief of the staff of the right column), at the time of the general attack by Prince Mirski's troops on the Sheynoff position, on December 28th, the Turkish fire grew weaker, and then to the general surprise altogether ceased. It was impossible to make out through the smoke mingled with the haze of a cloudy day what was taking place at a distance, and the troops moved forward without knowing what had taken place, and both sides sustained severe losses before it was ascertained that the Turks had surrendered.

This too will serve as an example. During the action at Sheynoff five battalions occupied Kazanlik, three of which were ordered to move on the village of Goozovo. "They had not emerged from the town, when they heard musketry fire, and a doubt arose as to whether a corps of 10,000 men had not come to the rescue of the Turks. Kolomeatsi was abandoned until the circumstance was explained. It was subsequently ascertained that the fire was that of a few Bashibazouks, yet it caused the whole column moving to occupy the important position at Goozovo to halt.

During the action at Sheynoff General Radetski's troops in the valley occupying the Schipka Pass were in great difficulties. The General received a despatch from Prince Mirski which concluded with the following words "You must send me ammunition and food." Meanwhile at night and during the twilight the moving lines of musketry fire rendered it evident that Prince Mirski was engaged. From daybreak the locality was covered by a dense fog. This fog prevented General Radetski's troops from seeing the approach of General Skobeleff's detachment to Sheynoff, while a high wind which had risen prevented them from hearing the cannonade from the valley. Between 10-30 and 12 A. M. it was reported from an observing post on St. Nicholas that occasional vollies and the fire of single guns were audible to the west of Schipka village. East of that an occasional musketry fire was audible. These observations were incorrect, as at that time the action in the valley had attained its greatest intensity, but the reason of this was that the wind whistled in the rocks and drowned the report of the fire. Were the powder nearly noiseless, wind would not be necessary to render the fire inaudible at such a distance, as that from Sheynoff to Mount St. Nicolas.

"In the meantime," writes General Kouropatkin, "if the cloud had risen for an instant, and the orderly advance of the Imetti detachment could have been clearly seen from Mount St. Nicholas (or had the wind fallen and the sound of the fire become audible), General Radetski, assured as to the success of the engagement, could have deferred his action, as there was no necessity for re-enforcing the right column, and the seventeen hundred heroes who fell in the fierce fight at Schipka after the engagement had ceased lower down might have continued to serve the Czar." But this it was impossible to ascertain, as nothing could be seen, and hardly anything heard.

Finally, and this is one of the finest passages in the narrative of the action at Shreynoff.

General Skobeleff carefully followed the course of the engagement. The time approached when it would be necessary to bring the reserves into action. "How many have we in reserve?" "Where are the reserves?" "Are they not too far off?" These were the questions Count Keller had most often to answer. Knowing how his personal example acted on the advanced troops, he might himself have moved forward into the fighting line, but this would have been the equivalent of the expenditure of the main reserve before the arrival of the decisive moment of the attack.

Those moments must not be allowed to slip. Skobeleff belonged to the number of born commanders who do not make a mistake on such occasions. He knew how to feel the pulse of the action, and accurately estimated the now ebbing now convulsively vigorous beats of that pulse. What others did not understand was clear to him. In particular he perfectly understood the music of war, and could distinguish the notes and harmonies he required amid a thousand sounds. The intensity, uninterruptedness or intermittance of infantry fire, the direction and frequency of artillery fire, the movement of a line of smoke, the appearance of those who came out of action with despatches, the substance of the despatches, their form and appearance, the aspect of the wounded carried from the field &c., &c., things which escape the notice of others, told Skobeleff what he should decide. In this music of war Skobeleff knew his key note and guessed the approach of the moment when it was not only necessary to re-enforce the troops in the firing line, but also for him to accompany them into action. How many precious notes are included in this harmony! How much the music of war will be weakened, and the hues of its picture dimmed, when neither the roar of the fire nor its smoke continue to add their striking shade either to the music or the picture!

A Spartan King, who saw a catapult, then a novelty, among the jactile weapons of antiquity, exclaimed. "Alas the end of warlike valour has come!" Should it not be exclaimed now in anticipation of the introduction of smokeless and noiseless power? "Alas the music of war is silenced!"

The Spartan King was mistaken: not only catapults, but also 110 ton guns, explosive shells, and magazine rifles have been unable to deprive the soldiers using them of valour, and we may hope that if, thanks to the new powder, the music of war will be silenced, its picture will stand out more clearly.

If we lose one of our organs of sense, do not the others become more energetic? If the ear does not performs its functions, the eye has to be more alert. The manner in which this principle can be applied to war is pointed out by the development of contemporary artillery. At first direct and breaching fire were brought to prefection, but cover placed a limit to them, as an earthen bank even of inconsiderable height intercepts a shell fired direct; then artillery tried cross-fire, but cover increased in height, and now curved fire has attained perfection. The shell flies up and comes down on the target from above, passing over all the obstacles that were efficient against direct and crossfire.

The new powder with its noiseless discharge will render it impossible to follow the music of war, and it will throw death-dealing shells and bullets from guns and rifles imperceptibly to the eye; thus it is much more difficult to follow the course of the engagement and the enemy is protected from observation.

This can only be counteracted by seeking means to look at the field of battle from above it, which will be found an effectual antidote to this new military poison. The best possible system of observation must be opposed to the new powder, and the picture of the smokeless battle-field must be surveyed from a great height in order to view its entire extent.

Valour has not ceased to be the decisive factor in war, notwithstanding all the technical improvements that have taken place in the means of warfare, commencing with the catapult, and concluding with the magazine rifle. It has not lost its influence, because the result of a war does not depend upon those inventions which are at the disposal of both sides, but on the gallantry of the officers and soldiers, and the ability of their commanders. There is a modern invention to oppose to smokeless powder. Its advantages and drawbacks apply to both sides, so its use will not affect the influence of valour. It is incontestible that, as far as leaders are concerned, the introduction of smokeless powder will increase the difficulty of directing a fight. They are therefore more then ever before in need of information, as besides the talent necessary to follow the course of the engagement, the best leader now requires to see—see—see, in order to be able to direct it.

Thus the invention of smokeless powder has imparted a great significance to the direct view of the battle-field, and has rendered the organisation of observing parties, and the preparation of appliances indispensable for both field and fortress warfare. Such observations can be carried out either from watch towers or balloons; the latter are either captive or free.

Watch towers.

All local objects, such as high trees, buildings, church towers, and artificial immoveable towers erected on a spot on some other occasion, such as Cossack watch towers, must be classed as watch towers. Every elevated point that is favourably situated and commands an extensive view (e. g. the steeples at Strasbourg and Metz in 1880, Mount St. Nicholas at Schipka, in 1877, and such like) may serve as an observing station. It must, however, be borne in mind that, in war observations have to be directed to a definite end, therefore the means made use of must fulfil certain conditions that are seldom to be found in local watch towers.

The first and most important of such conditions is the portability of the tower. It must necessarily be seen by the enemy, and once any such object is seen by him, the question of its destruction by artillery fire is one of time, and that probably a short one. A portable tower alone can remain intact and serve for a careful observation within gunshot of the enemy, as its position can be changed. A local immoveable tower is not always situated in a good position, nor does it always command an extensive view, and finally, it is not always possible to observe from it those points on a field of battle it may be necessary to see at any given moment. Finally the very mobility of field armies and the difficulty of foreseeing those places where a more or less decisive action will take place renders it necessary that watch towers should be able to accompany a field army, and that their mobility should not be less than that of gun carriages, the most mobile of field carriages. Just as a gun has to be able to come on a position, and occupy a given point, in spite of the difficulties of the ground, so it should be possible to bring a field watch tower to any point, whether on a road or not, even across hillocks, and stumps of trees, and down steep slopes, and they should require for their traction not more than six horses. Hence it follows that, whatever may be the place upon which field watch towers are constructed, their entire weight including the carriage should not exceed nineteen hundred-weight, the weight of a field gun behind the teams.

The normal elevation which the watch tower can give to an observer is the second condition. The watch towers, that have been constructed up to the present have been from 80 to 100 feet high. The height has been placed within these limits because it is not worth while to make one less than 80 feet high, while considerations of weight render it impossible to construct one more than 100 feet high. The watch towers adopted in foreign armies are 84 feet high.

The third condition is, that the tower should be capable of being raised to any height lower than the maximum, which will often facilitate its concealment, as there is no reason why it should be raised to its full height, when a lower would be sufficient.

The fourth is an essential condition, that the tower should be simply constructed, and easily raised or lowered, either of which operations should not take more than ten to fifteen minutes, and it should not require an establishment of more than 8 or 10 men.

The fifth condition is, the stability of the mechanism, and that the tower should not be liable to damage, and be easily repaired.

The type of field watch tower we at present have does not fulfil these conditions The lightest of them, that of Wildgroube, is complicated in construction, easily damaged, and requires a large attendant personnel, as it is very unstable when raised to its full height; while it cannot be adjusted to intermediate ones.

However, the fact that there are not field watch towers fulfilling the necessary conditions, does not prove that such could not be constructed. Art will certainly find the means for the purpose, and they must be found for a field watch tower, as an elevated and mobile observing station will undoubtedly be of use in active warfare; and the small height (maximum 100 feet), to which they can be raised, is always better than the ground level from which nothing can be seen, or a church tower which will be destroyed by the enemy's shells.

With the new powder and field mortars, mobile watch towers appear such a valuable and indispensable assistance, that it would be advisable to have not less than two of them to each infantry division (or still better one to each regiment of infantry*). And one to each cavalry division.†

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* A Russian Regiment consists of 4 Battalions, a Brigade in our service.

† There is hardly any doubt as to the value which field watch towers would have for cavalry for reconnoitring service and the transmission of signals. Our cavalry especially the Cossacks often made use of watch-towers in the Turkish war of 1877-78, but only local or improvised ones.

The principal and most insuperable defect of the watch tower is the relatively small height to which it elevates the observer, and consequently the relatively small horizon it gives him, while the conditions are not always favourable for observation; for from a watch-tower 84 feet high points as near as 2000 yards are seen at an angle of depression of 1°, so that though the movements of masses of troops would be quite apparent, local obstacles could easily interfere with a careful observation of them.

A balloon is different. At a height of 1400 feet it gives at 2000 yards an angle of sight of 12°, at 3000 about 8°, at 5000 about 6°, and only at 24 miles does its angle descend to the level of that of the field watch-tower.

The horizon of an observer from a balloon extends six miles, and with the aid of a telescope moving hostile masses can be discerned at from nine to twelve miles.

We shall here confine our attention to the conditions of observing from captive balloons*, and shall see how far practical use can be made of such observations; to what extent they are reliable; and how they can best be carried out.

It has been proved by experiments carried out for both peaceful and warlike purposes, that observations from a balloon can be of great use and are perfectly reliable.

The military use of balloons.

On the 1st June 1862 in the action near Richmond, General McLellan made successful use of observations carried out from a captive balloon at a height of 1000 feet. The balloon was connected with the head-quarters by telegraph, and McLellan received constant intelligence of the enemy's movements. He was thus enabled to concentrate two divisions, one of which had to be moved forward from behind the Chickahominy. The General was able, owing to the information supplied from the balloon, to form an accurate idea as to the course of the engagement throughout its vast extent, and select the proper moment for a decisive stroke, which was attended by complete success.

When we have mentioned the battle of Fleurus in 1794, in which the French success is directly attributable to observations from a balloon, we have exhausted the occasions on which balloons have hitherto earned the right to have their services considered on a par with the other factors that lead to victory. Though balloons have been subsequently used for tactical and technical purposes in France (Paris and Metz) in 1870-71, in Egypt in 1885, and in Tonquin in 1886, their use was not attended by such decisive results as those attained by McLellan, although the value of their services in these campaigns is generally admitted. The Germans have often expressed their regret that they did not make more use of balloons in the campaign of 1870. Thus in the 'Almanac for sailing vessels' of the year 1889 it says that, had the German army had balloons before Metz and Paris it, would have had timely notice of the most important measures taken by the enemy *e. g.* the retreat of the

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* The consideration of the conditions which affect observations from free balloons has not been undertaken, as in the present state of aeronautic science a systematic employment of free balloons is out of the question.

French Army of the Rhine, which commenced on the 13th August, and its passage across the Moselle for the sortie of the 31st August. Similarly in the siege of Paris, all the great sorties undertaken by the besieged might have been observed, and the requisite measures taken to prevent them, which would have saved the German army much unnecessary loss.

Can it be denied that, if the Russian army had had balloons from which the movements and actions of our troops as well as the camp of Plevna and the dispositions of Osman Pasha's reserves would have been as visible as though spread out on the palm of one's hand during the battle of the 30th, 31st August (11th and 12th September new style), it would have been spared the enormous losses which attended the storm? In this connexion another circumstances requires note. According to the testimony of the Germans in the campaign of 1870-71, the appearance of a balloon in the air had a depressing effect on the troops and their leaders. It was very disheartening to see and feel that it was impossible to avoid the impertinent eye which followed them, from which the slightest movement could not be hidden, and before which skilfully planned secret operations lost their significance.

Though few examples of the employment of balloons in war are available, such as there are sufficiently clearly prove that an observing post; supported by a balloon at an elevation of 1000 to 1800 feet above the surface of the ground is able to present the commander-in-chief with a picture of the action, and to facilitate the determination of the important point and the advent of the decisive moment of the engagement; besides which early notice can be given of turning movements or the arrival of re-enforcements for either side, rendering timely measures possible.

These examples do not, however, furnish a sufficient proof of the services which observation from a captive balloon may render from a technical point of view, by which we mean observation of artillery fire to correct it, watching the course of works in the attack and defence of fortesses, and so forth.

In the blockade of Metz the tower of the city cathedral answered the purpose of a balloon for the defenders. The look-out stationed there incessantly guided the fire of the fortress guns by telegraph, and once the Germans were obliged to abandon one of their camps on which a fire was directed from information supplied from the cathedral tower, though until then the besiegers had considered the camp perfectly secure.

The peace practice in engineer schools and at manœuvres, which has taken place during the last six years in all the European States, is much richer in definite results. It has in the first place worked out the general character of aerial navigation, and determined the materiel requisite for the formation of field and fortress balloon parks, and the rules to be followed in making observations.

Without entering into the details of the organisation of balloon parks and their composition, we wish to point out the objects of the service and the results that have been attained by the experiments that have already been carried out, and to prove that by the use of balloons it will be possible to a great extent to eliminate the influence of smokeless powder on modern warfare. The experiments in the schools, and the practice at manœuvres of late years in France, England, and Germany, and at our manœuvres of 1886 and 1888 have determined the following conditions with reference to balloons as military observing stations.

(1.)—At a height of from 1400 to 1700 feet the horizon extends to 54 miles or more, but at such a distance it is difficult to discover anything. Good observations can be carried out up to six or nine miles. It is possible to examine the country up to 15 or 18 miles, but only moving masses of troops are visible, and cavalry can only be distinguished from infantry by the use of a telescope.

At an elevation of 1000 feet troops can be easily perceived with the naked eye up to distance of five miles; columns of infantry cavalry, or artillery can be distinguished from one another, and from their shape and extent it is possible to judge of their order and strength. It is only possible to use a binocular with a large field of view for distances below nine miles. The dust raised by troops on the march conceals them from view, but its thickness and extent render it possible to estimate the strength of the column.

(2.)—Trom an elevation of 700 feet or more the general view of the action both as regards our own and the enemy's forces is very clear.

(3.)—A hilly country can be observed from a balloon, but frequent villages, high brush-wood, and woods completely cover troops. In an intersected and wooded locality it is necessary to have the balloon at its maximum elevation of about 2100 feet while in open spaces an elevation of from 500 to 700 feet is sufficient.

(4.)—Intelligence can be communicated from a balloon through a speaking trumpet up to 600 feet, by notes in envelopes weighted with sand, by telegraph, and by telephone. The car should communicate by wire with the station of the commander; writing letters and sending messages by orderlies disturbs the attention of the look-out party and wastes time. In the French manœuvres of 1886 news by telephone from a balloon arrived twenty minutes before it was communicated by cavalry.

(5.)—Fog, the haze on a hot day, and smoke accumulated over the scene of a severe engagement interfere with balloon observation; the first altogether, the second only on the horizon; when there is a breeze smoke only conceals the details of the action.

(6.)—A high wind (up to nine yards a second) interferes with observations, as it shakes the balloon and may bring the car to the ground.

(7.)—Manœuvres with a balloon are not prevented by a wind under seven yards a second. With a steam gyn the elevation of the balloon is accomplished in two or three minutes, the descent in five. The balloon can be moved at the rate of two and a half miles an hour along roads, and at the same rate by hand across country if there are no roads. With a wind of not more than from five to seven yards a second velocity a balloon can move as fast as an infantry column.

[Here details are given of experiments in the Russian manœuvres of 1886 and 1888]

These examples show that balloons afford reliable information upon which the commander of a force can base his dispositions. They also prove that this guidance, based on observation, can supply the place of the music of war for the direction of gun fire with the new powder.

Let us now consider the technical experiments carried out with captive balloons. This is the rôle of the balloon as the antagonist of smokeless powder. It has been remarked above that, in a well screened position, clouds of smoke alone serve for the more or less exact determination of the position of the target. Although foreign military writers have frequently stated that observations from balloons will render the correction of fire at concealed objects possible, this has not yet been practically proved. The only available guidance is that furnished by the practice carried out by our balloon park in 1888.

The following were the results of the practice:—

(1.)—From a balloon at an elevation of 1400 feet at a distance of 3000 yards the reconnaissance of fortified positions gave the following results. It was possible to determine the extent of the works; to distinguish works from batteries; to ascertain the plan of the works and whether the ditches were wet or dry; to calculate the number of traverses and barbettes; to determine the profile; to discern clearly the external construction of the fortifications, and even the damage they had sustained from artillery fire.

It is certain that it would be impossible to obtain such valuable results from any other reconnaissance of an enemy's position.

(2.)—Fortifications and batteries can be concealed by brushwood even from observations from a balloon, unless its elevation is more than six hundred feet. At the greatest elevation of the balloon bushes no longer afford cover to the object; such great elevations however, are only practicable when the car is connected by telephone with the battery in action against the object, as throwing down letters is too slow a means of communication and the speaking trumpet is inaudible.

An intersected locality, and brushwood do not present the observation from an elevation of five or six hundred feet of an enemy's battery in action, which betrays itself by the report of the discharge and clouds of smoke. We may assume that in this case even high trees, woods &c, do not screen the target, as though it is impossible to see smoke behind them from the ground level it is different when we ascend to a height. In any case high trees, avenues, and woods are the best mask for fortifications, and unless fire proceeds from them, it will be very difficult to determine their position, and of course even more so to ascertain the details of their construction even from a balloon at its full elevation, if it is more than two or three thousand yards from them.

(3.)—Wind interferes with accuracy of observation, covering the target with smoke from our shells; and a fog completely conceals the target.

(4.)—Observations made from a balloon at a distance of some 2000 yards are much more accurate than those from ordinary observing stations. It can be ascertained whether the shells fall to the right, or left, short, or over, while it is possible to determine from a balloon the exact part of the work into which the shell falls; whereas the observing post, judging by the colour of the smoke on the burst of the shell, only signals "in the work." It is not yet possible to distinguish the exact amount 'over' or 'short'; however, it is to be anticipated that more practice, and training the observer in perspective, will render it possible.

(5.)—The distance of the target from the balloon can be very accurately determined, as the position of both can be found on the map, and the intervening space measured. The conditions of field warfare seldom require fire at unseen objects, but in wars of position such as Metz, Plevna, and Schipka, the services of balloons will be indispensable, and they will be if possible more necessary for fortress warfare.

We shall now consider the characteristic features of fortress artillery warfare, assuming that smokeless powder and balloons are at the disposal of both belligerents.

The advantages of the attack.

(*a*) The dispersed nature of the targets offered to the enemy.

(*b*) Their small profile, which only offers a small target to the enemy, and (*c*) renders it easy to screen them in an intersected country.

The disadvantages of the attack.

(*a*) The comparatively small mobility of its armament, owing to the absence of properly constructed roads.

(*b*) The absence of local cover (groves, thickets, villages &c.) in the neighbourhood of the fortress, for the defender will take timely measures for its destruction.

(*c*) The weakness of its artillery at the commencement of the struggle.

(*d*) The necessity of having the parks, camps, and stores a long way (3 or 4 miles) from the fortress.

(*e*) The necessity of bringing up from the base the requisite material for filling balloons.

The advantages of the defence.

(*a*) It can disperse the objectives of the offensive in the intervals between the forts.

(*b*) It can offer the same small profile.

(*c*) It can cover them by local screens and artificial cover prepared beforehand.

Besides these,

(*d*) The works of the fortress have a permanent character.

(*e*) The artillery armament of the fortress, as well as all the means at the disposal of defensive, is mobile; its mobility is increased by the presence of metalled roads and railways within the fortress rayon.

(*f*) The neighbourhood of the forts is cleared of natural cover, especially bushes and trees as the most dangerous.

(*g*) The overwhelming strength of the artillery, which can be concentrated for a massed fire on the works of the attack under direction from a balloon, though these objectives are distant and covered.

(*h*) The success of this sort of fire can be assured for the defence in the first place, by practice from the guns during peace; in the second, by the preparation of good plans of the fortress rayon at a scale of $^1/100$; in the third, by the possibility of firing by plan, which facilitates the direction of the fire on an unseen object, the position of which is determined from the balloon.

In fortress warfare balloons do not afford the same assistance to the assailant in the bombardment of unseen objects as they do to the defender, as the position of an artificially masked target cannot be exactly determined without detailed maps; and were the position ascertained, the direction of siege guns on a target, especially its destruction by the concentrated fire of several batteries, would in the absence of maps be very difficult and would occasion a great loss of time. On the other hand the possession of plans renders it possible for the fortress artillery, immediately on receipt of intelligence from the balloon, to open fire on the target pointed out, as the plan enables each gun to be accurately directed on it, not only the direction, but the angle of elevation and the fuse being given. In order to show the efficiency of such a fire, it may be mentioned that, in France, where firing by plan has been adopted for fortress artillery, in experiments carried out at one of the fortresses on the eastern frontier, 120 fortress and field guns were able to take part in the bombardment of a point between five and nine thousand yards from the defensive position. The direction of the fire of all the guns on the point only took from ten minutes to a quarter of an hour, and after an hour's bombardment the neighbourhood of the point fired on (a cross road) forming a square of 280 by 100 yards was torn up by shells, as though it had been ploughed. An observer in a balloon is the only person who can point out a target 5000 yards or more distant, and direct the sighting shots. But I repeat that, even though the assailant is able to do the same, his success and rapidity of execution will always be less than that of the defenders, owing to the want of peace practice with prepared maps. Thus it appears that smokeless powder is more favourable to the defensive than the offensive in fortress warfare, as on the former side the balloon neutralises the masking power of the new ammunition.

(*i*) Besides, the defensive has more facilities for making use of balloons than the offensive, as an inexhaustible supply of the materials necessary for filling them can be collected in the fortress. A captive balloon can avoid destruction by being moved with its crane along and across the position, an advantage not possessed by the assailant, who, owing to unfavourable local conditions will generally have to separate the balloon from the crane, moving it by hand even across telegraph wires, which are under-ground within the fortress rayon.

Hence it is evident that serious attention must be devoted to aeronautic service to improve both its materiel and personnel, especially the observers, who should, for tactical purposes, be selected members of the general staff, and, for technical, artillery and engineer officers.

It is true that balloons will be of especial use in position and fortress warfare, but it is impossible to deny their value in every description of engagement, especially in reconnaissances. We have seen that in favourable weather they can keep up with infantry, therefore the minimum normal proportion to accompany field troops should be a balloon park for each army corps; each balloon park should include not less than four balloon cases, two ready for use, and two in reserve, two steam cranes, and a hydrogen generator.

In the case of a fortress the more balloons there are the better. Their uses in a fortress are various. It is necessary to watch several points simultaneously in the fifteen or twenty miles of its periphery. The observation from some must be exclusively tactical, and from others confined to the successful direction of the fire on siege batteries and works, and the examination both general and detailed of the whole course of the attack.

The proposed establishment of balloons for field troops is a very moderate one, while their service is of such a nature as to render a larger number desirable, especially if we consider the inevitable losses both in balloons and appliances which must take place on service. But it is necessary to await the time when a better apparatus for generating oxygen shall have been devised for field service The principal inconvenience of the existing apparatus is the weight of the essential materials (sulphuric acid and water), and the time necessary for the collection and packing of the appliances for a march. Hence generators of the present type have to be placed from three to five miles in rear of a position, so that in case of retreat they may not fall into the enemy's hands. Filled balloons take up their position in action held by hand or attached to a crane, and have to return to the generator to be refilled. When the weather is favourable, especially when there is little wind, the balloon does not require to be refilled for three or four days, but if there is a strong wind, it may require fresh gas every day; hence the inconvenience of having to take it back to the generator, for if the troops advance during its absence the balloon cannot overtake them, and it may arrive at the scene of action too late. Hence the park must consist of not less than two filled balloons: then if both lose their power, one can be refilled from the other, and remain with the troops, while the other returns to the generator.

Economy would be misplaced in the balloon establishment to accompany field armies, and more so in that for fortresses, as balloons are a valuable means of observation, capable of laying bare the position of the enemy and rendering nugatory most means of obtaining cover, including that of artillery and skirmishers. If we may so express it, the smokelessness of the new powder will only arrive at its maximum efficiency when the balloon is regarded at its proper worth, neither as a freak of contemporary inventive act, nor as an interesting accessory, but as a real military observing station which it can be made at any moment. Besides, its value increases in proportion to its use, which should be incessant from the beginning to the end of war. This is only possible when there are a sufficient number of balloons present in an action for their information to supplement one anothers, and with a thoroughly competent technical and observing personnel. The important services which captive balloons will render to both the opposing forces will assuredly have the natural consequence that, each side will endeavour as quickly and completely as possible to rid itself of an impertinent observer. Every means will be employed for the destruction of the adversary's balloons or the prevention of their use.

Three means are at present available for this purpose, *viz.* gun fire, rifle fire, and the capture of the balloon. We shall consider how far each of these means is effectual. Captive balloons are comparatively safe from small arm fire but shrapnel is more dangerous.

Experiments in England and Germany have proved that shrapnel and splinters of common shell occasion such serious damage to the cover of the balloon, that, owing to the quick escape of gas, the rents become larger, and the balloon falls to the ground. However, by throwing out ballast, the observer may manage to descend in safety.

At Kunersdorf in Germany two balloons were hit by shrapnel from a range of 5000 metres, one balloon at an elevation of 300 feet, and the other at an elevation of 800 feet: at the twentieth round both were hit by from twenty to ninety bullets. Consequently, even at very long ranges, shrapnel is a formidable enemy to balloons. In actual war, however, it will be impossible to estimate accurately the distance of the balloon and its elevation. It will sway in windy weather and can be moved up and down and to and fro when necessary. It must also be taken into consideration that none of the enemy's batteries will be ready to open fire on the balloon immediately on its appearance, so that an effectual fire cannot be brought to bear on it for from twenty minutes to half an hour, by which time the balloon will have fulfilled its mission, and the observer, when he finds the fire becoming dangerous, can signal for the balloon to be moved to one side; or he can have the balloon lowered, and the crane removed to a position further forward or back, and so oblige the enemy to commence his sighting shots over again. Accuracy and continuity of observation suffer not a little from such manœuvres, especially when there are several balloons on a position. This is one of the reasons why a balloon park should have not less than two filled balloons always ready for action.

The nearer the balloon is to the enemy's position, the more unsafe it is, as the accuracy of the fire and the possibility of an exact determination of the distance to it become greater, but at the same time the angle of elevation increases for the guns, and, though siege guns and mortars can fire at these elevations, field guns cannot. It may therefore be laid down that, at a considerable height, 1400 to 1800 feet, and at near distances not exceeding 1200 to 1400 yards, a balloon will be almost safe from field artillery; so that on occasions an observer can brave the fire and go forward in safety. However, the nearer the balloon approaches to the enemy, the more dangerous becomes the position of the crane and personnel. Hence in such a case the crane must be well under cover in brushwood, groves, or woods. In the defence of prepared positions and in fortress warfare it will be possible to place the crane on a suitable earthern slope, but this is only a palliative and will only be efficacious until the enemy finds out its position. Besides, an embankment ties a balloon to a fixed point and prevents its manœuvring In our opinion mobility affords the most reliable and convenient protection to the balloon and its personnel.

As observations taken from a distance are only valuable in reconnaissance and not for technical purposes, on every occasion on which observations can be carried out within two or three thousand yards from the enemy's position, a great advantage will be gained, as they can be taken without the aid of telescopes. The observing parties should be practised at taking observations from long ranges as the most difficult, and it should be impressed on them that they must move forward as near the enemy as possible, and that the loss of the balloon is counterbalanced by the necessity of obtaining information It may also be remarked that, though many experiments in firing on balloons have not been carried out, those that have been justify the conclusion that the observer runs no greater risk in the car than on the ground, where he could not fulfil his duty without moving in advance of an attacking force.

It need not be said that artillery must practise and devise means for taking the range of balloons; and perhaps a new gun will be invented, like the well known 3 *C. M.* Krupp gun, which was used by the Germans before Paris without any great results Perhaps also a new projectile may appear which will cause the gas in the balloon to explode.*

Speaking generally, balloon warfare is in its infancy, and requires considerably more attention than the question of the use of captive balloons during an engagement.

Finally the balloon, or, more strictly speaking, its crane, and personnel may fall into the hands of the enemy or be annihilated. This can occur when the balloon is left without an escort, as happens to artillery in war, or when the balloon goes too far forward, or if one position is carried by the enemy and the balloon has not made a timely retreat. Very likely the difficulty of destroying a balloon in any other way will lead to special dispositions for its attack. The observer in the balloon will always see the advance of the attacking party and can retire; however, a strong wind, confusion among the personnel, the carelessness of the observer, or an obstinate determination to stand his ground owing to the importance of his observations may enable the enemy to reach the crane. The personnel will then act according to circumstances *i. e.* they will fight and die round the crane like artillery men round their guns, or destroy the apparatus and make a timely retreat. The crane will fall into the enemy's hands, but not the balloon. In the first place the observer can cut the attaching rope, and take a free flight trusting himself to the mercy of the wind. In the second place before resorting to this extreme measure, he can try and defend himself by hand grenades charged with pyroxiline. Two or three such shells thrown from the balloon would not appreciably lighten it, while the successful burst of one among the enemy would have a great moral effect, and would save the balloon at least long enough to allow of the arrival of re-inforcements.

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* If the balloon is filled with hydrogen, it is recommended that the projectile should be fitted with a sponge-shaped platinum head, which will condense the gas on its surface and cause it to ignite.

Thus even in this case, a captive observing balloon does not take part in war under very unfavourable conditions.

We have remarked above that balloons are undeniably better observing stations than watch towers, but that they do not exclude the use of the latter, if only because even one balloon requires a whole attendant park and heavy carriage, while a watch tower, though it is not a lofty observing station, requires only one carriage.

At a critical moment even a watch tower is not to be despised; its 80 to 100 feet of height is no small matter, the more so as it is impossible to carry about lofty trees and church towers, and they are seldom to be found when and where they are wanted.

Colbert narrates that in the battle of Wagram, Napoleon himself did not despise the use of a watch tower. "The Emperor went from one end of the field to the other in a state of great excitement, and in order to see the course of the action better, he climbed on a double ladder, which accompanied him and issued his orders from it. He encouraged the troops by his presence and his apparent confidence of victory." In contemporary war the arena of fortress or field warfare will not be a field of battle which a commander can take in at a glance as of old, but a series of such fields. While in the contests of the armies of the present as of the past there will exist a decisive point and a decisive moment to be determined by the commander, yet a modern fight will be distributed over so large a rayon, that he will not be able from any point to survey the whole extent of the field. The leader can only take a comprehensive glance at the general course of the engagement by means of captive balloons and watch towers. It does not appear surprising that, in progressing modern times, the double ladder with which Napoleon would not part at Wagram will develope into a portable watch tower, or a captive balloon, accompanying head-quarters to the battle-field, ready to afford, when the moment comes, an extra chance of victory in spite of smokeless powder.

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RECRUITING FOR THE NATIVE ARMY.

Paper read by COLONEL F. LANCE, C. B.
On 3rd August 1890.
MAJOR-GENERAL SIR J. BROWNE, K. C. S. I., Quarter Master General
in India, in the Chair.

GENTLEMEN,

I must disclaim any pretensions to dignify the remarks that I am about to make by the name of a lecture. This term conveys the idea that it is the intention of the lecturer to convey instruction, whereas in this case, the various aspects of the important subject that I propose to bring to your notice this afternoon are probably better known to many whom I have now the honour of addressing, than they are to myself.

I was asked by the council of the U. S. Institution, to offer some remarks on any subject of interest that would form the basis of a discussion, and it is with the object of inviting a discussion, on a matter that deeply affects the efficiency of our native army, that I have ventured to address you this afternoon.

Few of those who have contemplated the possibility of increasing the native army to the large extent, and with the short notice that a sudden emergency might necessitate, can have failed to entertain some misgivings as to the success of such an attempt.

Although in England it has been predicted, that, in event of a war, adventurous spirits who will not tolerate the dull routine of military life in peace time would flock to our recruiting stations, the experience of eleven years ago has taught us that most of the classes from which our native army is now recruited do not come forward with alacrity to fill the gaps made in the ranks by the ravages of war, and that the spirit of adventure, or the desire for military glory is not sufficiently strong among many of these classes to overcome in time of war the hesitation to encounter the chances and risks of the camp and the battle-field.

It seems to be the invariable rule in India, perhaps more than in western countries, that, as civilisation advances, and order is enforced, peaceful and profitable pursuits destroy the military spirit and tastes of the people, and the innate love of adventure is transferred from the broad highway of war to the narrow and tortuous paths of litigation.

The result is that the races who fought under our banners, and helped to win our victories in earlier times of Indian history, are not those to whom we now look to form the backbone of our native army, and on whose assistance we calculate to oppose a mightier foe than any whom our Indian forces have yet faced.

We must now look for the flower of our native army among peoples who have more recently come under our rule, and whom the blessings of the "*Pax Brittannica*" have not yet enervated as well as tranquilised.

Nor can we hope that even those races whom we now rely upon to provide us with sturdy warriors can escape the influences to which their predecessors have succumbed.

I do not wish to say a word in disparagement of our Punjabi soldiers, but no one can contend that the military spirit that pervaded the Sikh nation in the palmy days of the Khalsa has now any existence among the civil population.

Where would you hear now, as was the case in those days, that the village maidens of the Manjha took farewell of their soldier brothers with a Punjabi couplet, that exhorted them to bear themselves bravely in the coming fight, and that if they failed they would on their return consider them as sisters, and would themselves assume the rôle of brothers?

Old Sikh soldiers have often said that the youths of the rising generation are far less well grown than their predecessors, accounting for the deterioration by the fact that the children are not now reared on the abundance of milk which was available when waste lands, now placed under cultivation, afforded sufficient grazing for the large herds of cattle that were then maintained.

Now, while making every allowance for the tendency to extol the past generation at the expense of the present, which has existed ever since the days when Horace wrote "*Ætas parentum, pejor avis, tulit nos nequiores*," I think that those who have known the Sikhs for some time must allow that the complaint in this case is made with some reason. Even further north, civil officers will tell you, that well to do young Pathans, who in the days of the mutiny would have deemed the offer of a commission a great honour, are not now so anxious to accept military service, and it is not now easy in Pathan districts to find young men of family possessing character and physique, that would make them serviceable native officers.

The sources from which regiments serving in northern India are recruited have been hitherto limited to a few well known classes, who, up to the present, have provided good soldiers in sufficient numbers. Not only has the demand for soldiers from some of these classes largely increased in India, but service in Burma, Hong Kong, East Africa, and other countries offers inducement to the best men of these classes that has already told on recruiting for Punjab regiments. The improved condition of the peasantry has also contributed to the difficulties of recruiting, and should the necessity arise for any large increase in the native army, it is more than doubtful whether the classes from which the Punjab army is now recruited could meet the demand.

Assuming then that the classes from which our best native soldiers are drawn are too few to admit of a large expansion of our army, and that even these classes are liable as time goes on to suffer deterioration in their soldierly qualities, it remains to be seen whether we have not within our reach other material that might be successfully worked up, and whether there are not other classes to be secured, who either have not accepted military service, or for whose services no demand has been yet made.

The difficulty of introducing new classes into old regiments is well known. The few individuals of new classes (generally not the best of their class), for whom vacancies can be found at one time are more or less isolated, they are seldom represented in the higher ranks, and their position is consequently one of discomfort: they therefore either leave the service, or they are not considered so desirable as to induce the commanding officer to enlist more of their class. It is therefore on the occasion of raising new regiments, or of the augmentation of existing ones, that the best opportunities occur of introducing new blood into our army, and this can be most advantageously done *not* by enlisting them in driblets, but wholesale by troops, companies, squadrons, or even regiments of one class. In a new regiment chiefs or representative men can be given appointments in the commissioned and non-commissioned grades, who will, for their own credit, bring good men to serve as privates, and these privates will be contented, serving with their friends under native officers of their own class, who will watch their interests, and to whom they can appeal when in difficulty.

I trust I may be excused if I remark that the feelings of officers, entrusted with the responsibility of raising new corps, naturally tend to making use of the classes with whom they are acquainted, and on whose qualities as soldiers they know by experience they can rely; the transfer too of a certain number of trained men very much lightens the arduous work of raising a new corps, but I need hardly add that, if it was determined to carry out the policy I have indicated, there are plenty of officers who would consider it a high honour to be entrusted with the responsibility of introducing new elements into our army, and who would spare neither labour nor thought in carrying out an experiment on the success of which their reputation depended.

It now remains to consider what raw and untried material is ready to our hands to work upon. Enough has been said about the degenerating influences of peace, and possibly of plenty, on the native population, to show that the wilder parts of the Punjab, and our North-West frontier are localities in which such material should be sought for.

However tempting may be the grand physique and fine courage of the independent tribes who live beyond our north-western border, I do not propose to recommend an increase in our army of a class, which, notwithstanding its many fine qualities, must always be an element of danger and anxiety in troublous times. It is true that many instances have occurred of trans-border soldiers doing grand service in our ranks against those on whose side all their sympathies must have naturally been enlisted. Many of us have heard the story of the Afridi soldier who, when rebuked by his officer during a hill skirmish for sitting inactive, and told to shoot at one of the enemy who was making himself specially conspicuous, replied that he had had three shots at him already, and that as he was his own father, he had thought it better to stop; but many of us on the other hand can call to mind instances, when suspicion of the fidelity of such men has seriously added to the anxieties of their officers and their comrades. The conduct of a few men of this class has ere now clouded, if only for a time, the reputation of fine regiments, and the experience of the past shows the wisdom of employing men whose homes are beyond our control, only in limited numbers, and under special precautions.

Of the classes within our border whom I propose to bring to your notice, the Baluchi is the largest. The Baluchis are extremely hardy, and of very fair physique; they are free from fanaticism, and the records of many hard fought fights amongst themselves entitle them to claim credit for bravery, as reliable at least as that of many of the tribes in the Punjab, who are considered worthy to fill the ranks of our native army.

For many years the Baluchis have been glad to serve in our border militia, and to accept other miscellaneous employment, but they have, only in rare instances, accepted service in our regular army, and I am inclined to think that even of these so called Baluchis, some are not true Baluchis but hangers on, or what are called "Hamsayas."

They are so numerous that, if once their objections to serve could be got over, they could provide any number of soldiers that we are likely to require from them.

The Baluchis are extremely conservative, and thirty years ago, the reply of "*Ussi Baluch log*" was considered by them to be an unanswerable reason against adopting any proposed innovation, but of late years they have not shown themselves so averse to changes, provided that it is to their interest to make them. It is supposed that they have an inveterate objection to wear uniform, and that they will wear nothing but white cotton clothes, but the chiefs are not averse to donning smart colored garments of kinkahb and other rich material, when they wish to appear at their best, and if they thought it was for their benefit, it would not be difficult to persuade them that khaki was not very different from their conventional white, which indeed in most cases it is not

That the Baluchis are wild and impatient of method and discipline cannot be denied, but, if trained under carefully selected officers, who will at first show consideration to their prejudices, and exercise judgment in dealing with them, there is no reason that they, like the wild Multani horsemen raised in the mutiny, should not in time turn out good and well disciplined soldiers.

The Baluchis cover a very large extent of country, and the above remarks probably apply more or less correctly to any of the Baluch tribes who have come under British influence; but the Dera Ghazi Khan district is the only part of the Punjab in which Baluchis of the true type live.

If commissions were offered to the relatives of the chiefs of these tribes, I am inclined to think that a regiment of native cavalry could be raised from tribes residing either in that district or near the neighbouring borders.

Kasranis and Wehowa Khetrans	1 troop	1 Squadron.
Lunds and Bozdars	1 troop	
Kosahs		1 Squadron.
Lagaris with Khetrans, Hudianis & Lasharis		1 Squadron.
Gurchanis and Drishaks	1 troop	1 Squadron.
Mazaris	1 troop	

With perhaps a few Bugtis and possibly Marris.

Cis Indus, the hardy inhabitants of the Thal lying between the Indus and the Jhelum, and those of the Bar, between the Chenab and the Ravi, would probably enlist either in the cavalry or infantry, if an effort were made to induce them to do so; and ought to make good soldiers. The Punjab Government could doubtless point out tribes, like the Sials in the Jhang district, who might be induced to take service if commissions were offered to some of their representative men, and who would form a nucleus which could be added to when necessary.

To return Trans Indus. There are tribes I think in the Dera Ismail Khan district who might be worth a trial. It was of the barren country of Kolachi that Sir Herbert Edwardes wrote that it produced little except good melons and brave men, and the Gundapores who inhabit it have already taken service in small numbers in the 1st Punjab Cavalry and have done well. The Oosteranus, a small tribe living under the shadow of the Misri Roh, partly inside and partly outside our border, might furnish us with some good recruits, and even the wild Shiranis need not be despised. Then there are the Bitannis, who have the ill fortune to be sandwiched between the British and the Mahsud Waziris, and have to keep on good terms with each.

The Mahsud Waziris are not averse to leave their country when offered profitable employment, and I believe the high pay offered attracted them in some numbers to the work on the Hurnai railway when it was under construction. They are daily being brought more under our influence, and might ere long, if not now, furnish a valuable contingent to the Punjab army.

In the Bannu district the inhabitants of Marwat, that is the country lying roughly speaking between the Gambela and the low hills that connect Shekh Bodin with the Suleiman range, would make fine soldiers, if the hitherto unconquered objection that they have shown to take military service could be overcome by the offer to head-men of appointments in the commissioned and non-commissioned grades.

The Isakhel Pathans who inhabit the country below Kalabagh are fine men, who have already taken service to a limited extent in the cavalry;

some of the relatives of the chiefs are fine young men, who could bring soldiers of good physique, many of whom are excellent horsemen.

Of the Bannuchi himself, I will not say much. He was branded by Sir Herbert Edwardes with the accusation of practising every crime in the decalogue, in addition to some not there enumerated, but he was nevertheless always able to hold his rich lands against the Waziri who coveted them, and even he might be worth a trial.

Various sections of the great Durweshkhel Waziri tribe reside permanently within our border between Janikhel and Latummar, while others, like the Hattikhel, visit our territories for certain periods of each year. They are hardy and brave men, and if organized and disciplined would make valuable soldiers.

These are some of the sources to which we might look for the introduction of new elements into our native army with a view to its augmentation when required. These Mussalman tribes might also beneficially counterbalance the strong Sikh and Hindu element, which is now serving in our ranks.

Finally, gentlemen, I trust it will be understood that I have brought this subject forward in no spirit of disparagement of the races who are now serving under our banners, and who have fought our battles in various countries with gallantry and devotion; and I can only hope that, should it be ever the fortune of the wild and hitherto untried tribes, whom I have enumerated, to be trusted to serve in our ranks as comrades beside them, they will heartily strive, in quarters to imitate their discipline and order, and in the field to emulate their deeds.

The following discussion took place after the reading of the paper.

BRIGADIER GENERAL SIR JOHN McQUEEN, said.—Gentlemen, although I agree with most of what Colonel Lance has said in his interesting lecture, there is one point, however, in which I do not hold with him, and that is, "that recruiting of Pathans should be, as far as possible, restricted to those residing within our border."

No doubt from a regimental point of view, it is better to have soldiers whose homes are within British border, as such men are less likely to desert with their arms and ammunition, are more civilized and less prone to commit any serious offence or crime, but from a broader and imperial point of view, it is certainly the interest of Government to widen the field of recruiting among the trans-frontier tribes, in order to extend our influence and hold over them. Loss by desertion and of a few rifles would be much more than counterbalanced by the gain to Government from the extension of British influence and power over the tribes generally. I need only instance the case of the powerful Afridi clan in support of my statement. If there had not been so many Afridis in our service at the commencement of the Afghan war, most, if not all of the sections of that clan, would have taken the field against us, and they would have proved a much more formidable foe in the Khyber than the Afghan army did, and necessitated the maintenance in that pass of many more troops to keep that route open for our convoys &c., than we fortunately had occasion to employ there.

The following shows that many Afridis being pensioners and others in Government service greatly influenced their decision to side with us, and not throw in their lot with the Amir of Kabul. Just before war was declared an Afridi native officer said his clansmen were most anxiously considering the pros and cons of what they should do, which side they should join; and they desired particularly to know whether Afridi pensioners fighting against us, or perhaps not coming to offer their services would entail loss of pension; again, would men on leave not rejoining, or the clansmen generally fighting against us, afterwards affect the enlistment of Afridis into our ranks? On being informed that such conduct would most certainly affect and probably altogether bar the enlistment of men of his tribe, he replied, "I must at once send my brethren word about this, as they are anxious to know what action Government is likely to take regarding them should they fail to render service to the sarkar. I know for a fact that many, if not all the Afridi jirgahs, did discuss the above-mentioned points, and the well known benefits accruing from Government service made them decide that it would pay them best to throw in their lot with the British Government.

There are many Pathan clans on our border besides the Afridis, from whom we could obtain excellent soldiers, and it would undoubtedly be to the interest of Government to give men of these clans service, not only in our regiments, but in our border police and militia. Employment and good pay would before long attach such clans to us, and they would not only be of the greatest assistance in keeping open and guarding for us passes through their country, but might some day be of use in combating any foreign foe, who migh wish to pass through their territory.

Enlisting more freely than we have hitherto done from trans-border tribes would also pave the way to extending our influence to clans beyond them. If we had only done so 20 years ago, we probably should ere this have opened out routes through their hills, and we should not now for instance be communicating with Chitral viâ Kashmir and Gilgit, but by the more direct and easier route through Swat and Bajaur.

There are many hardy and brave men, who would make excellent soldiers, to be recruited from Bunerwals, Bajauris, Mohmands, Urakzais &c., and it would be most advantageous in more respects than one that we should do so. The enlistment of some of these tribesmen besides Afridis should be commenced as soon as possible, for the mere fact of our not enlisting them, whilst we are so freely enlisting Afridis, will turn the heads of the latter, who are already beginning to think their services are indispensable to us, and on this score will before long give us trouble in our dealings with them.

G. M. OGILVIE ESQ., C. S., said.—It is difficult to give a definite opinion as to why some tribes on the Punjab frontier enlist freely in the regular army, and others are distinguished by a disinclination to enlist.

The Marwats of Bannu for instance would appear to be a tribe which would naturally be addicted to military service, whereas the fact is that very few men of this tribe are to be found in the native army. So far as I am aware no official enquiry into the causes of these differences has been made. I have myself a theory that *agriculturists* submit much more readily to the discipline of regular military service, than men and tribes whose occupation and manner of life are chiefly *pastoral*. This does not afford a *complete* explanation of the differences between tribes as above described, but I think that it is nevertheless true so far as it goes. Another reason why men of certain tribes do not enlist appears to me to be simply that sufficient endeavour has not been made to effect a beginning. Men are very much like sheep: where one goes others will follow.

Turning now to the tribes in detail, I observe that the Baluchis are of two classes. There is the ordinary agricultural Baluch who is found both in the Dera Ghazi Khan district and in the Sind Sagar Doab. This kind of Baluch does not differ essentially from the ordinary Jat agriculturist. These Baluchis *do* take service. I know of many Baluchis of this kind, both pensioners, and men still in active service. Again, there is the real Baluch tribesman who is only found in the Dera Ghazi Khan frontier and in Baluchistan itself. This Baluch tribesman is rather a pastoral man than an agriculturist. These tribesmen will serve readily enough in *irregular* forces, such as frontier militia and levies, but will not submit to the discipline of the regular army. My own impression is that efforts to enlist these men in the regular army will *not* be successful. Of course, however, trial ought to be made.

There are certain Pathan tribes on the border who are agricultural rather than pastoral, and I think that if methodical and sustained effort is made to overcome the existing prejudices of some of these tribes against military discipline, there is no reason why such effort should not be entirely successful. The Marwats of Bannu, and Gundapores of Dera Ismail Khan, are tribes which ought readily to accept military service. Then there are the Pathan transborder tribes, over whom our influence has quite lately been extended. The most notable of these are the Shiranis, and my belief is that, if a fair beginning can once be made, this tribe, together with other tribes living in the Zhob valley and its neighbourhood, will become a promising field for the recruitment of the native army.

There is another consideration in reference to these tribes which must not be overlooked. Our influence over them has been established; and although they are not as yet classed exactly as British subjects, yet they are differently situated to purely independent tribes like Swatis or Afridis.

Lastly, there are the Mahsud Waziris, over whom our influence has been *to some degree* extended. There are, no doubt, certain peculiar difficulties in connection with this tribe, but still I think that, if a fair commencement could be made, many recruits might be obtained from this tribe.

SIR GEORGE CHESNEY said—I do not think that it is at all a matter of certainty that the influences of civilisation have had the degenerating effect on the classes from which our best soldiers are drawn, that seems to be generally supposed. If recruiting had completely fallen off among any particular class, heretofore deemed warlike, the fair inference might perhaps be that the class in question had changed in character. But if we find, or as in fact we do, that recruiting has not stopped, but has only fallen off in amount, the conclusion to be drawn appears different. If, for example, a class which formerly supplied (say) 50,000 soldiers now furnishes only 10,000, we have no reason to suppose that the 10,000 who come forward are different in character and feeling from those who stay behind, and the fair conclusion therefore seems to be that it is not degeneracy but some other cause which keeps this majority away. And the cause is surely not far to seek. Although it is true that in many indirect ways the condition of the soldier has been improved of late years, yet the actual rate of pay has remained the same throughout the century, while the rate of wages in the labour market has doubled, probably trebled, within that time. Is it to be wondered then that the people do not come forward with alacrity to encounter all the risks and restrictions of the soldier's life, when the sepoy's pay is less than the earnings of a common labourer? I hope that, when we require to increase our forces, the offer of pay more in accord with rates ruling in the labour market will secure all the soldiers that we are likely to require.

It is no doubt, however, desirable to enlarge the sphere of our recruiting, and I trust that we may be able to secure the services of some of the tribes enumerated by Colonel Lance, who have not yet accepted our employ as soldiers.

With reference to Colonel Lance's remarks on the danger of employing soldiers who belong to independent tribes beyond our border, on the score of their liability to fail us at the critical point, we certainly all know that on certain occasions they have proved untrustworthy. Perhaps the most notable case is that in the last war, when two shots were fired during a night advance on the enemy's position, which might have entirely marred the results expected from the intended surprise; but I would ask you to remember, that, in all European wars, similar instances of treachery have frequently occurred. During the Peninsular war a considerable force was attached to our army composed of deserters from the French; yet we should not say that the Frenchman is not a man of patriotic feeling. Still more remarkable, during the siege of Sebastopol several English soldiers deserted to the enemy. It is therefore not reasonable to argue that, because a few instances of infidelity have occurred among the wild border men, who have served in our ranks, we should not avail ourselves of the services of men, who are grand soldiers, and who have generally done us loyal service. In the next war in which we are likely to be employed, we shall probably be fighting on the side of the Afghans, in which case the sympathies of these men will be more heartily on our side than they were on the previous occasions referred to.

I am old enough to remember the first proposals being made to enlist Sikhs in our native army, the precautions with which the enlistment of Sikhs was surrounded, and the great care with which the number was restricted. I can remember also the forebodings indulged in by some of the consequences of enlisting Sikhs. We all know how wise the measure proved to be, and what noble service the Sikhs did us only a few years afterwards. I have therefore no fears about enlisting Pathans and border tribes more freely, and I cordially agree with Sir J. McQueen in his estimate of the political advantages to be gained in having a large number of men in our ranks, who are connected by domestic ties with the country in which our armies may not improbably before long be operating.

COL. P. J. MAITLAND, Bo. S. C., said.—This is a most interesting and important question, and I hope will be taken up.

With regard to the Baluchis, the only race regarding whom I am competent to offer an opinion, it has for long been a matter of surprise to me that serious efforts were not made to secure their services as soldiers. Of the particular Baluchi tribes mentioned by Colonel Lance, I unfortunately know little personally, but their characteristics probably differ but slightly from the neighbouring Baluch of the Sind frontier with whom I was formerly somewhat well acquainted. This is the more likely, as the Baluchis of Persian Baluchistan appear to be very like those of Kachi, although so widely separated from them.

In my humble opinion the average Baluch is brave, enduring, and faithful. His general honesty and straightforwardness are somewhat remarkable, and he is absolutely devoid of fanaticism. In fact his religion sits on him rather lightly. I am rather surprised to find Colonel Lance saying Baluchis are wild, and impatient of method and discipline; my own impression has always been that they are unusually obedient and amenable to authority. It will be remembered that the Baluch tribal system is very different from the Pathan. The Baluch yields implicit obedience to his chief, and although every free tribesman has a right to express his opinion, it is rare for the chief's dictum to be disputed, and still rarer for it to be disobeyed. Of course incompetent chiefs are soon put aside by the tribe.

The faults of the Baluch are greed of money, a tendency to grumble, and personal dirt. In the first and last he is, I think, no worse than many Pathans. As to grumbling, I have often found it sufficient to remind the grumbler that he was "a Baluch." They do this to each other. Pride of race is strongly developed among all Baluchis, as far as I have seen, and I think in a more healthy manner than among Pathans.

As to getting Baluchis to enlist, it is well known there are certain initial difficulties, which however in my humble opinion are by no means insurmountable, if properly tackled, and it is just this which has never yet been done. The P. F. F. Officer has been too much occupied with Pathans and Sikhs to pay much attention to the Baluchis, with whom also he does not come much in contact. It is, however, with very great satisfaction that I see P. F. F. Officers turning their attention to the enlistment of Baluchis, as I am sure they will succeed, if given sufficient opportunity, and if undeterred by a few failures at the beginning.

To begin with, there is the uniform difficulty. I agree with Colonel Lance that this can be got over. If the men are not asked to cut their hair, there is no doubt they will accept uniform with a little persuasion. The influence of one young chief of repute would probably work wonders in this respect.

Secondly, there is the difficulty of getting them to go far from their homes. I believe one great reason of the reluctance of Baluchis to enlist is their dread of being sent into unknown parts of India. In the case of an entire regiment of Baluchis it might of course be easily arranged that they should only take certain frontier stations, say nothing north of Dera Ismail Khan. If this was promised by an officer in whom they could trust, that is to say by an officer whom they know, and who knows, and likes them, I think it would go far to remove a difficulty more serious than that of wearing uniform.

Thirdly, the discipline difficulty. As I have already said, I do not believe this exists as such. But, as I have also remarked, Baluchis are grumblers. In a whole regiment of new men, even with chiefs and other influential persons holding a fair proportion of places as Native Officers and Non-Commissioned Officers, it would be almost impossible to get along at first without a leaven of older soldiers, who have learnt that drill, stables &c., have a meaning, and are not merely "tamashas" invented for the amusement of the "Sahib-log." I should think these might be got from the 15th Bengal Cavalry, with a few (though very few) from the present "Baluch" battalions of Bombay Infantry.

Of course there will also be a difficulty about money. The Baluchis are mostly very poor. Few will be able to bring the full amount of money required for cavalry, and if money is advanced, and afterwards recovered in the usual manner, they will not like it. Here also the influence of older soldiers seems to be almost a necessity.

Colonel Lance of course knows much more about the Baluch on the Derajat frontier than I do, but a whole regiment seems a large number to get of those few tribes, considering that it would be a *beginning*. Why not recruit from the whole of the Baluch border? I should rather fight shy of Marris myself; they are mostly a mongrel lot, but there are a collectively large number of Bugtis, Dumbkis, Kighiris, Sehris, Kosahs, Rinds, Magzis, Jabranis and Chandikas, from whom recruits can be obtained, as well as from the Derajat Baluch. There would be no harm either in having some Brahnis. They would be easier to enlist than Baluchis, and would I think be rather proud of going into a real Baluch regiment, for they all, from the Khan of Kalat downwards, call themselves Baluch when they can. Of course it would be impossible to have every troop of a different tribe, but that would matter little, so long as troops were made up of friendly clans. There would probably be no friction if this were attended to, for most "asil" Baluchis pull well together.

It need hardly be remarked that selection of recruits would have to be most carefully made. I should not myself trust to chiefs bringing good men. They would just as likely as not bring their own "ghulams." Now a Baluch "ghulam" is often about as great a brute as can easily be found. It must be insisted on from the first that every recruit must be absolutely "asil."

It is also absolutely indispensable that the officer, or officers, charged with raising the corps should know and like Baluchis. Some officers, who have mostly had to do with Pathans, think there is no race like them. So also there are others who only care for Sikhs. These officers will not do to raise and lead Baluchis. They must believe in the Baluch, or the Baluch will not believe in them.

But after all I fear it will prove difficult to raise a cavalry regiment entirely of Baluchis. What I think would be more feasible, or at least more easily managed in the first instance, would be a "Guide Corps," of a battalion and one or two squadrons.

Perhaps also a proposition to raise such a corps might at the present moment be favourably considered.

MAJOR-GENERAL SIR JAMES BROWNE, K. C. S. I., C. B., said:—I cannot say I entirely agree with the lecturer's opinion, that the difficulties we now meet in obtaining the proper class of recruits for the native army are due to a decline of martial spirit. It appears to me to be simply a question of money; and that, whenever we are prepared to pay our native soldiers as good or better salaries, than any able-bodied man can earn for himself by labouring on roads or railways, we shall get as many good soldiers as we require. Sir Charles MacGregor and myself when going down the Hurnai railway together once had a lively discussion about the possibility of utilizing Hazarah workmen as soldiers; a scheme which Sir Charles had for many years recommended. Whilst by no means holding such a high opinion of Hazarahs' fighting qualities as he did, I did not deny that they might be useful as soldiers; but from long experience of them, I entirely denied that the wages offered them to become soldiers on the same scale as other natives would tempt one of them to take military service. So the first gang of Hazarah workmen we came to, we agreed to settle the question by asking them whether they would take military service; the immediate reply being supplied by a Hazarah who held up his pickaxe and said: "This rifle gives me a rupee a day and keeps me alive; why should I change it for a rifle giving me seven rupees a month in exchange for being shot"? Sir Charles admitted there was some truth in this sentiment. I think that, if we require good native soldiers at a crisis, we can get them, but only by paying for the same.

But, as the lecturer has rightly observed, undisciplined recruits enlisted at a crisis would take long to train; and here I think the necessity comes in, of our arranging to have in peace time a body of officers so trained, and so experienced, as to be able in a crisis to rapidly raise and organize bodies of native troops. The system of having what may be called "commanding officer regiments" in the native army is to my mind a dangerous one. Such a regiment in which the commanding officer does everything himself may be very smart, and a very efficient fighting machine; but it fails entirely to create the school of officers we want, who from their youth up have been accustomed to select, to train, and to manage native soldiers. I would allow every subaltern, from the day he enters a native regiment, to have a voice in the selection of recruits. Every company commander should be encouraged to feel that he was personally responsible for his own recruits; and before an officer became a second-in-command of a regiment, he should have been so long and so constantly employed on recruiting duty, as to be able to say, "If ordered I know exactly where to lay my hand upon recruits in the nursery grounds which supply my regiment, sufficient to double the number of men of my particular class. I know the villages, the headmen of the villages; and to a considerable extent am personally acquainted with the candidates in every village, and know how to get at them; and I will be personally responsible for their being good men.

"*Commanding Officers'*" regiments have their good points, but will never create the class of officer we want to organize the vast masses of native soldiers whom we might at a crisis have to raise. We cannot strive too earnestly to create such schools.

As regards Baluchis, I think there is a reason which has not been noticed in the discussion, as explaining our difficulty in getting them to enlist. We are told they object to discipline, that they don't like uniform, and are dirty; all of which are serious objections to Baluchis, although no one doubts their courage, their endurance, their unfanatical spirit. But to my mind the real reason is that a Baluchi is one of the most incurably lazy men on earth, and avaricious though he be, his avarice will not overcome his laziness; and that is the simple reason why he will not enlist and take up the steady regular habits of a soldier, which go mightily against his innate laziness. His objections to discipline, to white clothes etc. are mere excuses; the real reason being laziness. This was exemplified by the fact, that whereas in the construction of the Hurnai line, enormous wages were being paid to workmen flocking from all parts of India and amounting at times to 40,000 men, no native Baluchi could ever be induced to do a single day's work. This is, and I expect always will be, an insurmountable obstacle to having regular troops composed of Baluchis. They are too lazy ever to make regular soldiers.

I believe, however, that in the event of a war any British officer, accustomed to managing them, would find no difficulty in raising large numbers of Baluchis who would make fully as efficient cavalry as most of that which would be brought against us. They would make excellent scouts; with a keen military 'savoir faire'; with a great love of fighting for the fun of fighting. If well armed they would do us excellent service, where our irregular cavalry could not find means of living; and I believe they would be remarkably loyal soldiers; for they are the very antipodes of the Afghan, in that a true Baluchi has all the instincts of a "*dhoonewassal*" to his Highland Chief; where the Afghan is a born free lance and republican, to whom fidelity to any employer is a mere question of who has the longest purse.

The Baluchi's obedience to his Chief justifies the belief I have just expressed that, if properly managed, and his "*gifts*" utilized by an English officer who know his ways, and does not insist upon the fetish of cleanliness and smartness, which, however admirable with the European

British soldier, would be "anathema maranatha" to irregular Baluch levies, otherwise admirably suited to meet Cossack or Turkoman cavalry, he would be strictly, and in his own way, amenable to discipline. When travelling alone in the Marri hills with two Marris to whom I had been entrusted by Maomullah the Chief of the Marris, (the most notorious and daring of Baluch robbers), one man beat a drum at nightfall and about one in the morning at each of our camping grounds, whilst the other bawled out for the benefit of any skulking Marri robber, who might have been watching us that Maomullah's "*Hukm no*"—(new order) was that I was not to be robbed or in any way molested. The result was that one morning, a robber who had stolen my saddle from camp, in the interval of time between the two mystic drum beats and proclamations, brought me back my saddle of his own accord, explaining that "he did not know the Chief's new order"--but that he had no idea of disobeying it.

I would ask any officer here acquainted with Afghans, what chance I would ever have had of seeing that saddle again had it once got into an Afghan's hand; and how many drum beats would have been required to charm it back into its lawful owner's hands.

The lecturer warns us very emphatically against too freely enlisting trans-Indus Pathans; and there is no doubt much justice in his warning; on the other hand we must remember that, given a great mass of men like the frontier tribes, which are roughly estimated to number some 200,000 fighting men, whose capacity as guerillas and inborn knowledge of hill fighting is beyond doubt, we have a great object to attain in preventing such a mass of fighting material being utilized by an enemy. If we do not utilize them as soldiers the enemy will.

I do not know that the Afghan's bad name is altogether merited. He has deserted us when fighting against his coreligionists and fellow-countrymen; but what Englishman, serving France or Russia in the "*légion étrangère*" would care to have applied to his fidelity to his strange masters the test he complacently applies to an Afghan savage's fidelity to fight his own countrymen, his friends, and probably his closest relations; for the benefit, further, of what a Mahomedan calls a Kafir. It is difficult for an Englishman to understand how a Mahomedan's life is bound up in his religion, and what a test of his loyalty it is to have to fight for an infidel against a Mahomedan. To me it is very strange how loyal Afghan soldiers have proved themselves; and I do not think we have sufficient proved cases against them (fickle and untrustworthy though I know them to be) to warrant our not employing them in very large numbers. I might fairly ask whether desertion in the face of the enemy is a crime from which any European army can honestly claim to be free. Why apply a difficult standard to a mercenary Asiatic army?

If we are in search of new material for native soldiers, I think the Bikaneer desert below Ferozepoor would give us excellent soldiers; of splendid physique; and who are held in very wholesome awe by the Afghan Powindahs, who in their turn lord it over other races in Hindustan. The Jats of Bikaneer and Jeysulmere are a very hardy and powerful race, and I do not doubt that we could raise a few battalions of them who would give a good account of themselves.

I think we should quietly think over, and try and remedy a fact which it is difficult to give a satisfactory explanation of. Why is it that the native soldier, who, before he is enlisted, when badly fed, badly clothed, badly supplied with food, with no hospitals, and with no medicines, can stand without injury to himself any amount of hardship, exposure, fatigue, and extremes of temperature, collapses at once if exposed to similar conditions after he has become a perfectly trained and drilled soldier according to our ideas of a soldier. I have seen 5000 Ghilzai workmen with nothing but cotton clothes and perhaps a mangy poshteen, with no fuel to warm themselves with except what was sufficient, for perhaps an hour, to cook their scanty chapatti, lie out for November, December, January, February, and March in the Peshin plain, without an attempt at cover or tents, on the bare ground, in snow and sleet, with the thermometer ranging anywhere from freezing point to minus eighteen of Fahrenheit, and throughout that time without having a single man sick or sorry. How many commanding officers of native regiments would guarantee their regiments doing the same thing under similar circumstances? I should be extremely surprised if most regiments would not, under similar circumstances and after five months of such exposure, have disappeared altogether; even if every soldier had been recruited from amongst the very workmen, who had gone with impunity through similar exposure for years past, and as an ordinary, every day, business.

Whatever may be the reason, I think one of the most important problems we have to solve in the management of the native army is, to ascertain how it is, that our system of treating native soldiers succeeds within a very short time in making them utterly unable and unfit to stand the hardships, the exposure, the fatigue which he thinks absolutely nothing of in his own village, and under the natural conditions of his existence. Perhaps such a softening, and what may well be called for army purposes, a deterioration of physical and moral fibre may be an inevitable condition in army organization; but I should be very glad to see a reasonable and proper explanation, which would satisfy me that such condition is an inevitable and incurable result of modern science in the management of troops.

The following note on the subject was subsequently handed in by
BRIGADIER-GENERAL SIR J MCQUEEN.

Colonel Lance in his lecture remarked on the difficulties experienced at the commencement of the Afghan war in obtaining recruits for the native army, and gave as reasons for the same, that the advance of civilisation and enforcement of order had weakened the military spirit of the people of the Punjab and North-west Provinces, so that they did not come as readily forward for military service as they used to. General Sir George Chesney very justly criticised this, and attributed the difficulty of obtaining recruits more to the great rise of wages in the labour market: and that, (while the sepoy's pay had for upwards of a hundred years remained nearly stationary, the wages of the artisan and common labourer had more than doubled, and they were now much better off than the native soldier. That this is the chief cause of the difficulty in obtaining recruits, there is little doubt; but there is also, I venture to submit, another, though minor one, which was not referred to in the lecture, nor in the discussion which succeeded, but which in my opinion is one that very materially affects recruiting both in peace and in war time, and that is the want of a proper and efficient method of recruiting, one that will make recruiting *easier* and *more popular*. This want is not yet felt in the native cavalry, for which men still readily go to regimental head-quarters to enlist, but it is much felt in the infantry, and the remarks I am about to make refer almost entirely to that branch of the service.

2. It is well known to infantry officers that there is no work so distasteful or unpopular to native non-commissioned officers and soldiers as recruiting duty, and no one, except a soldier who has been so employed, really knows what are the wearisome delays, petty difficulties to be overcome, slights to be endured, and expenses that have generally to be incurred, before they can hope to get the recruits they have with difficulty obtained, examined and passed.

3. To give some idea of the petty delays and difficulties I have alluded to, I think it would perhaps be as well to describe what usually happens when recruits have been brought into a station for enlistment. They are generally brought from some considerable distance, and are first of all taken to the district or station staff office to have their names, &c., recorded in a roll, and fortunate is the recruiting serjeant or soldier, if the staff office clerk is a British soldier, for out of camaraderie and kindly feeling, he will, as a rule, do what is required without delay, and instruct them as to what hospital they should take their recruits for examination by a medical officer. But, on the other hand, should the clerk be a native, he will four out of five times, to show his power as a Jack in office, and perhaps to get a douceur out of the serjeant, keep the whole party waiting his pleasure for hours, if his Staff Officer is not present, or should he be engaged in a room from which he cannot see the recruiting party that is waiting. When, however, the native clerk condescends to do what is required, the party will probably arrive at the hospital too late to be examined that day by the medical officer, and so will have to wait until the next. Should it be a busy recruiting season or station, and the medical officer, whose duty it is to examine the men, has much other work, a native doctor is naturally called in to help, and he often examines a great number of recruits, and sometimes, though not generally, demands something from either the recruits or recruiting serjeant. The party, after the medical examination is over, have to go back to the staff office, where they are seen by the Staff Officer, and those that have been approved and passed are directed to appear some time or other at the commanding officer's quarters for inspection and final approval.

In this manner generally two to three days are spent in recruits being dragged from pillar to post in cantonments, often looking tired, miserable, and disgusted, and a warning to their brethren not to think of enlisting.

Should it be the winter season in the Punjab, they are probably suffering more or less from cold, being generally insufficiently clad, without either rezai or blanket, and with only a cotton sheet to wrap round them at night. They are probably also on rather short commons, unless the recruiting serjeant or soldier is paying for extra food for them out of his own pocket, in order to keep them happy and contented until they are passed; but many in the meantime, disgusted with delay, or persuaded by their relatives, either slip away or refuse to enlist, and so a great deal of the recruiting party's labour and trouble has been incurred with little or no result.

4. It would be an immense help to recruiting—
   (*a*) If recruits were more quickly examined and passed,
   (*b*) If there were regular quarters in some barracks or serais, in which recruits could be housed until examined, passed, and sent off to their regiments,
   (*c*) If in the winter, they were provided with a warm "barak kurta," or a sort of cloth stable jacket, and with either a blanket or rezai, the price of which could be paid out of their kit allowance.

The health of many recruits is seriously injured by their being sent to their regiments insufficiently clad. More consideration and care shewn for the welfare of the recruits in the preliminary arrangements for enlisting him, and less delay in carrying them out, would tend to make recruiting easier and more popular in peace, and so smooth the way for enlisting men in large numbers in war time.

5. At the commencement of a war, besides the ordinary method of recruiting, many carefully selected British officers with recruiting staff, including native doctors, should be employed in different districts to recruit for the army generally, recruits, however, being allowed to a certain extent to select their own regiments, and regimental recruiting parties passed for their own corps.

6 In war time a small bounty should be given to each recruit, from Rs. 15 to Rs. 20—only half however being paid on enlistment, and the balance on first issue of pay after joining the regiment.

7. A small sum also, say Rs. 4 or 5 per head, might be given to any one, soldier or other, bringing a man who is passed into the service. We use horse dealers to bring us horses for our cavalry and artillery, and ponies and mules for our transport; why should not in war time our recruiting serjeants, pensioners, old soldiers, or others, get something per head for every fine, likely young fellow they induce to enlist? Many such men for the sake of the rewards would do more than officers and recruiting parties have hitherto done or are likely to do, and besides they would save too many soldiers being sent away from their regiments on recruiting duty at the commencement of, or during, a war, when their services could ill be spared from their corps. Such individuals would know the most likely men in their own neighbourhood, and could be held responsible regarding their class, place of residence, and general character. I would even go further and employ some of the smartest

recruits just caught, as *decoys*—for, if well treated, and with half their bounty money besides their pay in their pockets, and the prospects of getting Rs. 4 or Rs. 5 on every man they enlisted, they would work up most enthusiastically among their village friends and acquaintances, and their influence and example naturally being great among those of their own age, they would certainly succeed in getting many to enlist, who otherwise would not think of doing so.

8. Short notices should also be freely distributed through districts (not posted on doors of police stations and tehsils which are not attractive places), showing the great advantages of active service beyond the British border or beyond sea.

In old days, in the time of Lord Lake's campaigns, the prospect of *plunder* was the great incentive to serve in the rank of John Company's armies, and so again in 1857-58 the prospect of plundering Delhi and Lucknow drew many a brave Sikh and rough and ready Pathan to our ranks. We cannot offer the inducement of plunder now; it would not only be wrong, but simply disadvantageous to ourselves in the long run by sapping discipline, &c. In its place, however, we could and should clearly show in concise notifications the great advantages of service in a regiment employed beyond our frontier or beyond sea, which might be enumerated as follows:—

(*a*) Regular pay, which can nearly *all be saved*, when free rations are given.

(*b*) Free rations.

(*c*) Bounty money on enlistment.

(*d*) Rs. 30 to purchase kit.

(*e*) Rs. 5 annually to purchase clothing, besides an issue of either a warm coat or pair of trousers yearly.

(*f*) Free issue of blanket, warm jersey, socks, &c., when going on service.

(*g*) Probable issue of 6 or 12 months' batta at the end of a campaign.

(*h*) Chances of promotion and extra rewards for bravery in the field, which perhaps might more than double pay.

(*i*) Pensions or gratuities to those wounded or invalided.

(*j*) Liberal grants of leave to visit home, and free passes by rail to railway stations nearest home.

(*k*) It might also be pointed out that a young soldier might in a couple of years on active service, when free rations have been issued and batta granted, easily save some Rs. 150; higher grades very much more. Such saving would enable the soldier, if he wished, to rent land, buy a pair of bullocks, perhaps sink a well, or help in paying off any mortgage on his ancestral acres, or even buy him an assami in a native cavalry regiment, should he desire to become a sowar and was fitted to serve as such.

9. What I would, however, wish above all to impress, if we have ever to increase our native army largely on a sudden emergency, is, that we must do so with energy, and not in a limp, dot and go one fashion, but do everything in our power to stir up a fierce enthusiasm

in men's minds for the cause for which we are going to fight, and consequently for the army which is going to do battle for the same, and in whose ranks so many of their brethren are serving. In fact, make the people consider and feel the cause to be a national one, though the regiments are composed of what *we call* mercenaries.

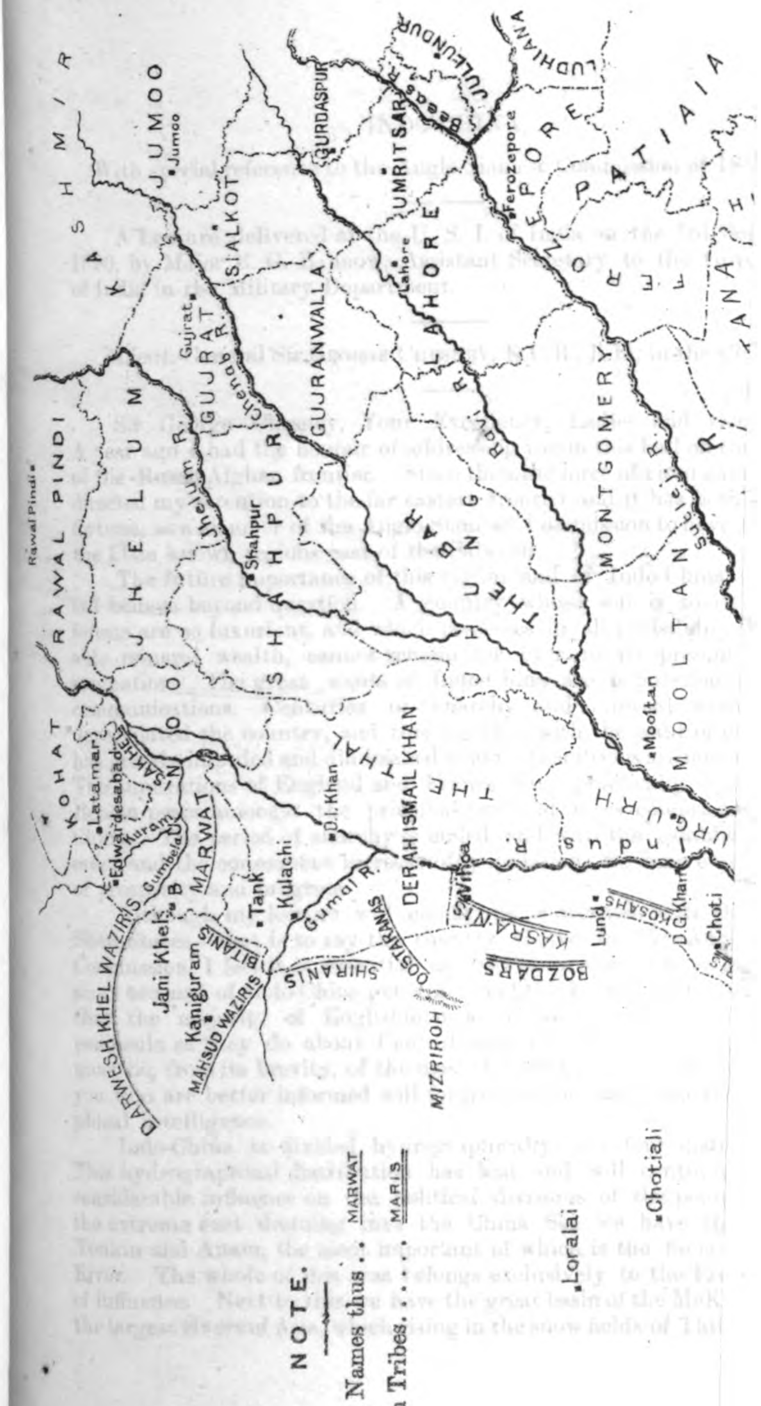
It is I believe quite in our power to call up such enthusiasm certainly in the Punjab and many other parts of India, and we would be foolish indeed if we neglected to use this most powerful weapon in our armoury against foreign invasion.

10. When enlisting soldiers for a great war, we should not confine ourselves to using only military officers and subordinates for recruiting purposes. We must look for help and aid to district officers and others. No men can do so much to instil an enthusiastic, warlike spirit amongst the people, and by their influence encourage them to enlist, as our district officers. They were the men who brought hundreds and thousands to our standards in the days of the mutiny, though it was of course the military who worked up the raw material into soldiers. But, whenever the emergency for recruiting on a large scale may occur, we shall certainly have to look to our district officers for aid, and it will be given as before readily and cheerfully, but best by those who know, and are known by their people, who are in touch with them, and have an influence over them, like Sir Herbert Edwardes and others, who had only to say "come," and they came, Multani and Baluch, Sikh and Punjabi; and when we were true to ourselves, as we were at Peshawar in 1857, even the wildest men from over the border flocked to our standards, attracted by the prospect of employment and regular pay.

11. British regimental officers sent to districts to recruit should be most careful to work in unison with district officers and their subordinates. Any want of cordiality in working with a district officer would at once be noticed by native officials, and successful recruiting checked.

12. When recruiting on a large scale for war, recruits should not be sent off in driblets. Large batches of young men are generally in high spirits and show off well, so others are in consequence often induced to join them. In England the fife and drum of the recruiting party used, as we know, to have a good effect, but the "surnai" and "dol" or native tum-tum has out here a much greater effect. Batches of recruits, wearing bright pagris of different colours, should be marched about the districts, and taken to railway stations and their destinations with as much parade and music as possible. Such show and parade stirs the whole country side—people think thousands are being enlisted, and a lively interest is engendered in the cause. A national feeling for the success of the Government in whose regiments their brethren are serving springs up, and recruiting proceeds merrily.

Something very similar to this I noticed at Kohat at the beginning of the mutiny days, when the Derajat and other levies called for by Edwardes and Nicholson were hurrying up to Peshawar under their chiefs and leaders in parties of from twenty to eighty and even hundred men, with banners flying and pipes playing. Until these men marched through the district, the people were quite apathetic and our regiments could scarcely get a recruit. Afterwards they came pouring in.


NOTE.
Tribal Names thus.. MARWAT
Beluch Tribes....... MARIS
KASHMIR
JUMOO
Jumoo
RAWAL PINDI
Rawal Pindi
KOHAT
JHELUM
Jhelum R.
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SIALKOT
GURDASPUR
UMRITSAR
JULLUNDUR
LUDHIANA
Beas R.
FEROZEPORE
Ferozepore
LAHORE
Lahore
GUJRANWALLA
Chenab R.
SHAHPUR
Shahpur
BANNOO
Latamar
Edwardesabad
Kuram
Gumbela
SAKHEH
MARWAT
DARWESH KHEL WAZIRIS
Jani Khel
Kaniguram
MAHSUD WAZIRIS
BITTANIS
Tank
Kulachi
Gumal R.
SHIRANIS
DERAH ISMAIL KHAN
D.I. Khan
USTARANAS
MIZIRIOH
KASRANIS
Vihoa
BOZDARS
THE THAL
JHUNG
Ravi R.
MONTGOMERY
MOOLTAN
Mooltan
Sutlej R.
MUZAFFARGURH
Lund
KOSHAS
D.G. Khan
Choti
Loralai
Chotiali
PATIALA
HISSAR
RAJPUTANA

INDO-CHINA,

With special reference to the Anglo-Siamese Commission of 1889-90.

A Lecture delivered at the U. S. I. of India on the 3rd September 1890, by Major E. G. Barrow, Assistant Secretary to the Government of India in the Military Department.

Lieut.-General Sir George Chesney, K.C.B., R.E., in the Chair.

Sir George Chesney, Your Excellency, Ladies and Gentlemen: A year ago I had the honour of addressing you in this hall on the subject of the Russo-Afghan frontier. Since then the force of circumstances has directed my attention to the far eastern frontier and it has been my good fortune, as a member of the Anglo-Siamese Commission to have traversed the little known regions east of the Salween.

The future importance of this region and of Indo-China generally is I believe beyond question. A country whose soil is so rich, whose forests are so luxuriant, and which possesses in all probability considerable mineral wealth, cannot remain for ever in its present state of stagnation. The great wants of Indo-China are population and good communications. Centuries of anarchy and internal warfare have depopulated the country, and this together with the want of good roads has greatly impeded and diminished trade. Conditions are now changing. The annexations of England and France have practically established a Roman peace amongst the principalities and races comprised in Indo-China. The period of anarchy is ended, and with the establishment of order and the consequent increase of population, we may expect an era of prosperity and progress.

Although my lecture will chiefly be concerned with the Eastern Shan States—that is to say the country visited by the Anglo-Siamese Commission, I feel it is essential by way of introduction to give you a short account of Indo-China generally, as I think I am right in supposing that the majority of Englishmen know as little about that great peninsula as they do about Central America; and as this description must be, from its brevity, of the most elementary nature, I trust those of you who are better informed will forgive me for insulting their geographical intelligence.

Indo-China is divided hydrographically into four distinct basins. This hydrographical distribution has had and will continue to have a considerable influence on the political divisions of the peninsula. On the extreme east draining into the China Sea we have the rivers of Tonkin and Anam, the most important of which is the Song Koi or Red River. The whole of this area belongs exclusively to the French sphere of influence. Next to this we have the great basin of the McKhong one of the largest rivers of Asia, which rising in the snow fields of Thibet, empties itself into the China Sea near Cape St. Jacques. The McKhong after leaving China flows throng Kaing Hung and Kaing Cheng, Shan States, whose political position has not yet been decided. It then enters the Lao States of Siam, states which are coming more and more under French influence, and finally sweeping through Cambodia and Cochin-China reaches the ocean by half a dozen great mouths. As Cochin-China is French, and Cambodia under French protection, it will be observed that China, Great Britain, Siam, and France are all more or less interested in the future disposal of the McKhong basin. As however the river on account of its rapids is for the most part innavigable, its possession is not really of vital importance. West of this we have the basin of the MeNam, probably the richest part of Indo-China, and which belongs entirely to Siam. Finally we have on the west the Irrawaddy and the Salween, rivers draining into the Bay of Bengal. This area includes western Yunnan, Burma, and the Shan States, and may be said to belong entirely to the sphere of British influence.

Apart from these hydrographic divisions is the long narrow arm known as the Malay peninsula. Here political dominion and influence are shared by England and Siam. The southern and western Malay States gravitating towards Singapore, and the northern and eastern towards Bangkok.

Thus you will observe that the whole of Indo-China is now practically divided between England, France, and Siam, whereas formerly many masters ruled over the land. Burma, Kaing Tung, the Shan States, and the greater part of Malaya have been engulfed in the red ocean of the British Empire; Cochin-China, Cambodia, Anam, and Tonkin are either French provinces or vassal states, while Chieng Mai, and the Lao States have lost their former comparative independence and are merged in Siam.

The ethnographical divisions follow closely the hydrography of Indo-China. I have not time to enter into the many interesting problems which the ethnography of Indo-China presents, nor into its many ramifications, but generally speaking the people are all much alike. The mixture between the brown and the yellow races, known as the Indo-Chinese race, is a type well known to most of us in the shape of the Burman, and though there are many shades of that type from the dark little Malay of the far south to the semi-Chinese folk who inhabit Tonkin, there is after all not much more difference between them, than there is between the Scot and the Pole, or the Dane and Italian. Successive streams of invasion Thibetan, Aryan, and Chinese, mixing with the black aboriginal races of the land, have produced the several races known to us as Burmans, Shans, Laos, Siamese, Malays, Cambodians, Anamites &c. The Shans, Laos, and Siamese, I should mention, are practically divisions of one race the 'Htai'. Besides these settled populations who are mostly dwellers in the plains, there are a number of hill tribes such as the Karens, Lahs and Wahs, KahKuis, KahKaws, Mutsos &c. All these various races, except perhaps the Malay and some of the hill tribes, are more or less wanting in courage, yet nevertheless the carriage of arms is universal. The men are not good marchers as a rule, and make most indifferent coolies. Contented and good-natured, they are but little inclined to hard labour; in fact they may I think be justly described as lazy and apathetic. Their wants are few and mostly such as are locally supplied. Rice is the staple food of the people, and of this there is generally a superabundance.

I will now pass in review the various states and provinces of Indo-China so as to give you a tolerably clear idea of the political situation before describing the Shan States.

Cochin-China.

Let us begin with Cochin-China, the earliest of the French conquests. This province lying at the extreme S. E. corner of the peninsula occupies an excellent strategical position on the route to China. Previous to the advent of the French, Cochin-China was a province of the Anamite Empire. Owing to the persecutions of French and Spanish missionaries by Tu Duc, Saigon was attacked by the allied forces of France and Spain in 1859, and in 1862 Cochin-China was formally ceded to France.

The colony has approximately the area of Mysore or Ceylon and a population of 1½ millions, chiefly Anamites. The country is for the most part flat, consisting as it does of one vast rice field, the alluvial delta of the MeKhong. The climate is excessively moist and not unlike that of Travancore. Saigon, the capital, is a well built city with handsome edifices, but the population is under 15,000. The garrison of the colony consists of about 5000 men *viz:*—

3 Battalions Marine Infantry.
2 Batteries Marine Artillery.
3 Battalions native troops.

Cambodia.

Cambodia is a native state under French protection. Its population and extent are about the same as that of French Cochin-China. The present capital is Pnom Penh, at which place there is a small French garrison. The early history of Cambodia is hidden in obscurity, but it was without doubt once the seat of a powerful, wealthy, and civilized monarchy of which the former splendour is attested by the magnificent ruins of Ang Kor on the N. E. shores of Tonle Sap.

Tonkin.

From the high plateau of Yunnan two important mountain systems jut out towards the sea, the one runs southward dividing the MeKhong basin from Anam, the other eastward forming the southern boundary of China. The country lying in the angle between these two systems is drained by the Song Koi or Red River, the basin of which forms the province of Tonkin. Tonkin consists then of a rich, level, rather unhealthy delta, and an extensive, but poorly populated hill country surrounding this delta, which may be described as a triangle with sides 50 or 60 miles long. The population of Tonkin is about nine millions, the greater number of whom dwell in the delta. The capital is Hanoi a town of 100,000 inhabitants. The chief port, Haiphong, is a miserable place on a boggy island.

Tonkin was formerly a province of the empire of Anam but revolted in the early part of the 15th century. For more than 300 years it remained practically independent but the great Anamite emperor, Gia Long, reconquered it at the end of the last century. From that time till the advent of the French it was held by the Anamites in spite of frequent and serious revolts The first military operation of the French in Tonkin took place in 1873 when Hanoi was seized and held by Garnier. By order of the French Government, however, it was evacuated early in the following year. The ensuing anarchy soon furnished excuses for French interference, and in 1882 Hanoi was once more captured by Rivière. In 1884 Anam ceded the country to France. There are few more romantic stories in the history of war than the exploits of the French in Tonkin in 1873, when great walled cities were captured by midshipmen.

Tonkin is now held by an army of over 20,000 men of which about one-third are French troops. This army comprises :—

4 Battalions of Europeans.
2 ditto Turcos.
17 ditto Natives.
4 Batteries of Artillery.

The native troops are well armed and equipped, but from all one hears are very inferior to our own native troops. The French were much troubled during the first years of the occupation by the Black Flags, but at the present day French rule is firmly established and order prevails throughout the country.

Anam.

Between Tonkin and Cochin-China lies the long narrrow strip of coast, which is now all that remains of the great empire of Anam. The mountains which bound it on the west are generally from 4000 to 5000 feet high. The population is variously estimated at from two to six millions. The capital is Hué a city which was fortified by French officers at the end of the last century. The best port is the Bay of Tourane, which in the event of a maritime war in the China Seas might become a point of considerable importance.

The connection of the French with Anam is interesting. It began with a missionary invasion in the early part of the 17th century. The missionaries suffered many persecutions but nobly persevered in their task Just before the French revolution a civil war broke out in Anam. The rightful heir to the throne, then a refugee in Cambodia, made friends with a French bishop and was prevailed upon to accompany him to France; a treaty was drawn up at Versailles and would have been executed but for the outbreak of the French revolution. This treaty was directly aimed at British trade and influence in the China Seas, and the memorandum on which it was based distinctly stated that the occupation of Cochin-China was the only way of counterbalancing British supremacy in India. Owing to the revolution the only result of that treaty was the despatch of a few French officers to Anam, by whose aid Gia Long was restored to the Anamite throne.

It is curious that after the lapse of just a hundred years the French have gained the very position thus sketched out for them by some scheming Jesuits.

On the death of Gia Long the persecution of the Christians recommenced, and in 1849 as a punishment the French bombarded Tourane. Ten years later war again broke out and ended by the cession of Cochin-China. In 1884 by the treaty of Tien Tsin between France and China Anam was acknowledged as being under French protection, and at the present moment it is practically a French colony ruled by the resident at Hué. In Anam the French maintain the following force :—

1 Battery Marine Artillery.
2 Battalions Marine Infantry.
3 ditto of Natives.

Siam.

Now let us turn to Siam. As I have already said, this country consists mainly of the basin of the McNam, but it also possesses in its feudatory states a large portion of the basin of the McKhong. Its area exceeds that of Bengal and the North-West Provinces put together, while its population is probably only about seven millions, of which *not* more than three are real Siamese, the rest being Laos, Malays, Chinese, Cambodians &c. At BangKok the capital there is a considerable British colony as most of the foreign trade is in British hands. Siam formerly was about on a level in civilization with the Burmese Empire but in the last 50 years it has gone ahead considerably and in the capital there is a strong veneer of civilization ; but the country is a hopeless one, the corruption of the higher classes, the tyranny of the officials, and the condition of abject serfdom in which the bulk of the people are held, point unmistakeably to the ultimate fate of Siam—namely the protection or suzerainty of some European state ; and it is this very certainty which makes the study of Indo-Chinese politics one of extreme interest and importance for Englishmen.

Subsidiary to Siam there are, as I have said, a number of feudatory Lao states. Those in the valley of the McKhong are surely gravitating towards the orbit of French influence. Those on the north-west are more closely connected with ourselves, and for this reason I will say a few words concerning them.

In all old maps the Shan country is shown as divided between Siam and Burma. It would however be more correct to say that the Shan States belong to Burma, and that the Lao States are dependent on Siam. There is a distinct difference in dress and dialect between Shans and Laos. The Lao States are all more or less directly administered by their own Princes, assisted or advised by Siamese Residents or Commissioners. The nearer the province to Bangkok, the more complete as a rule is its state of subjugation. Thus, while in Zimmé (Chieng Mai) the Siamese are all-powerful, in the provinces of the MeKhong valley, the French Resident at Luang Phra Bang has probably more influence with the local Chiefs than the Siamese representative. The only Lao States with which we are concerned are those within the consular jurisdiction of the English Vice-Consul at Chieng Mai; that is to say, the five states lying approximately between the 18th and 20th parallels of latitude and stretching from the Salween to about longitude 101° 30′, thus covering an area of about 250 miles by 150, approximately that of Portugal or Bulgaria. There are no very reliable estimates of population available; but taking an average of those we have, the aggregate population of these five States may be put down at three quarters of a million. The largest and most important is Chieng Mai. The smallest is Mong Phré, which is hardly as big as Wiltshire. Chieng Mai, from the right bank of the MeKhong or Cambodia river in the north-east to the Salween in the south-west, borders our trans-Salween territories. The MePing basin which is the best part of the province is a fine rich level valley, and the capital with its suburbs probably contains 80,000 or 100,000 inhabitants. It is in telegraphic communication with Bangkok.

The second in size, importance, and population of these Lao Provinces is Mong Nan, which includes the upper valley of the Me Nan, the valley of the Me Ing, which flows N. E. to the MeKhong, and also a long strip of sparsely inhabited hill country peopled by Lamets on the north side of the MeKhong. Thus Mong Nan covers the whole eastern front of these five Lao States.

The remaining states are Lakon, Lampun, and Mong Phré, all unimportant.

Each of these states has its own hereditary prince or chief, but they are becoming more and more subordinated to Bangkok and may now be considered part and parcel of Siam. Their main interest for us lies in the fact that they offer a considerable field for our undisputed commercial activity.

West of Siam lie Burma and the Malay States. To the former I need scarcely refer before an Indian audience, while as regards the Malay States it will suffice to remind you that English influence is there preponderant.

Now let us turn to the Shan States, which, unimportant in themselves, present political problems of considerable consequence to England, France, China, and Siam.

The cis-Salween Shan States I need not enumerate, They vary greatly in extent, population, and importance, but generally they may be described as an agglomeration of *Sawbwaships* controlled by British officers. Perhaps I might best compare these *Sawbwas* with the Kattiwar chiefs and the petty Rajahs of the Himalayan districts. The country is for the most part a fine open rolling plateau from 3000 feet to 4000 feet above the sea, seamed by three or four deep parallel valleys running north and south, these valleys being bounded by steep wooded ranges about 5,000 feet high. On the whole I consider the cis-Salween plateau to be as healthy and pleasant a country as any to be found in the tropics. The towns aud villages are of the Burmese type.

We now come to the trans-Salween country, the scene of the labours of the Anglo-Siamese Commission.

The trans-Salween country is for the most part a region of forest-clad hills varyng from 2,000 feet to 7,000 feet in height, their general elevation being from 3,000 feet, to 4000 feet. It presents no clearly-defined range of mountains, but rather a confused and intricate mass of hills where the several drainage systems may be said to overlap each other. The Salween, covering as it does the whole flank of our Burmese territories from north to south, is the most important military feature of the region. From the Ta Kaw ferry to Kyoukhnyat, that is for 290 miles, the limits to which our explorations and enquiries were generally speaking confined, the river is a broad, deep, swift one, the navigation of which is much impeded by rapids. It may be compared to the Indus at Attock. Very few roads traverse this region, and such as there are may be described as indifferent pack tracks. The villages are few and far between, and except at Kaing Tung itself no supplies are obtainable except rice and beef. Forage and firewood are however plentiful almost everywhere. The population is sparse and consists of Shans and Laos in the settled valleys, and of savage tribes, in the hills. During the months of December to March the climate is dry and fairly good.

The political divisions in this area are as follows:—

Beginning from the north-east we have the Sip Song Panna or State of Kaing Hung, a Shan *Sawbwaship*, lying on both banks of the MeKhong, from the Chinese frontier to about latitude 21°30′. The political position of this state has not yet been decided, but latterly it was undoubtedly considered part of the Burmese empire, though it also had relations with China. On the south-east Kaing Hung is believed to be contiguous with the Sip Song Puthai, a district apparently in the upper valley of the Nam Hu, which is now said to be in French possession; but though contiguous, these two districts are separated by a broad belt of forest and hill.

Below Kaing Hung comes Kaing Cheng which also lies astride the MeKhong. In Burmese times this district was subordinate to Kaing Tung. Since then Kaing Tung has absorbed the cis-MeKhong districts, while the trans-MeKhong portion has for the time being come under Siamese influence.

Below Kaing Cheng comes Kaing Sen, which is now in Siamese occupation and will probably be acknowledged as Siamese territory.

The only other states of importance which belong to the MeKhong basin are Mong Lem or Maing Lin Gyi and Kaing Tung.

Mong Lem abuts on Yunnan, but is separated from it on the north by a pathless mass of forests and mountains inhabited by savage aboriginal tribes.

Kaing Tung is the most important of the trans-Salween States, in area, in population, and in influence. It extends across the watershed to Mong Pu, Mong Sat, and the petty states on the Salween, and to the south marches with Siamese territory.

We now come to the Salween drainage. High up between latitudes 23° and 22° are barbarous little States, whose inhabitants are half Shan and half hill savages, and which have never yet been visited by Europeans. Below the Ta Kaw ferry we have Mong Pu, an outlying district of Kaing Tung. South of Mong Pu are the four trans-Salween districts of Mong Pan, a cis-Salween State, *viz.*, Mong Tuen, Mong Hang, Mong Chuat, and Mong Ta. Below these we have Mé Sakun and Mong Mau, trans-Salween possessions of Mokmai, while south of Mong Mau and nearly down as far as latitude 80° 30′ comes the strip known as trans-Salween Karenni.

It is to the districts bordering the Salween from Mong Tuen to Karenni that Siam particularly laid claim. They form a narrow strip about 175 miles long by 20 or 25 broad on an average. None of these districts are states in any sense of the term, but are merely outlying provinces of cis-Salween *Sawbwaships*. They are for the most part a region of forest-covered hills with very few settled villages, whose chief value lies in their teak forests.

The only town of any size or importance in the whole of this region is Kaing Tung, and as practically Kaing Tung is the capital of the whole country between the Salween and the MeKhong, it will not be out of place if I give a short account of it.

The Kaing Tung valley is about 10 miles long by 6 broad. To the north-east and west the valley is one immense paddy-field, intersected here and there by shallow irrigation cuts. To the south and south-west are gently rolling open downs and low grassy hills. The town, which is surrounded by a wall and ditch, consists of detached wooden houses built on piles of the Burmese pattern, and is imbedded in trees more or less thickly planted. Its greatest length is 1½ miles and greatest breadth one mile. The total population does not exceed 7,000. With the exception of two pagodas and a small guest-house, there are no brick or masonry buildings within the walls. The Prince's palace is a ramshackle, barn-like collection of wooden houses, surrounded by a brick wall. The roads are narrow and rough, much cut up by rain and traffic, and apparently never repaired.

The foregoing geographical description will enable you to follow the proceedings of the Anglo-Siamese Commission.

The annexation of Upper Burma left us heirs-at-law to the Burmese Empire, and it became necessary to ascertain the extent and nature of the property thus inherited and how much of it was worth our while to take up. Moreover, Siam had during the period of anarchy subsequent to the war quietly established itself in territories which were claimed by several of our feudatory states. The Anglo-Siamese Commission was appointed to enquire into these matters and to advise Government thereon, more particularly as regards the frontier line between the Shan States and Siam. With this object, the Commission left Burma at the end of November last. At Fort Stedman it was joined by its escort, 60 men of the Shan levy, and also by the reserve military escort, which consisted of 2 guns, 60 British infantry, and 100 Gurkhas under Col. Clarke O. L. I. This reserve escort was, generally speaking, to march a few days in rear of the mission, and only to be called up if required to give active assistance. The mission first marched into Karenni, where, you will remember, only the cold weather before we were engaged in active operations against the Red Karens. This once dreaded tribe has been completely cowed, and its slave raids have now ceased. It is a strange fact about these Karens that, though absolute masters of their own country with a chief of their own race, they live almost entirely in their wretched hill hamlets, while their three big villages or towns of Sawlon, Yuathit, and Sataw are occupied chiefly by Shans. This semi-civilization side by side with barbarism is most curious. At Sawlon for instance the *Poongi Keoung* is one of the most elaborately carved gilded monasteries I have ever seen. It is a perfect gem of its kind, and superior I think, as do others, to the one in the palace of Mandalay. At Yuathit in the bazaar you can buy condensed milk or fancy biscuits, while Sataw boasts of 'Europe' lamp posts in its streets, though I believe they are never lit. With all these signs of comfort and prosperity it is hard to believe that the filthy loafing savage gaping about the streets is the real master of the country and that the well to do Shans in the shops are only settlers. Our first objective was the ferry on the Salween opposite Yuathit, as from here we purposed sending out parties in various directions to survey and report upon trans-Salween Karenni. On our arrival we found Siamese posts of 30 to 50 men established on the opposite side at all the ferries up and down stream. At first these posts seemed inclined to resist our survey operations, so the reserve escort had to be called up. A show of force at once overcame all obstruction. After completing the survey of trans-Salween Karenni we marched up the right bank to the Ta Ung Mu ferry, where the main body crossed over. From here Mr. Scott and Captain Pink were detached to visit Kaing Tung, which they reached viâ Moné and Ta Kaw, and the reserve escort came to a halt, while we proceeded to visit the trans-Salween districts in dispute. At Mong Mau we met part of the Siamese Commission, but we had no official dealings with them. They had a small force of Siamese soldiers. These men were armed with repeaters, and clothed after the German pattern in uniforms of dark blue serge with red facings; they wore white helmets of Prussian shape. In spite of this they had rather an opera bouffe air, and our own sepoys, were not impressed, though I must say they were very well turned out, considering the amount of jungle marching they must have had. The march from Mong Mau to Mong Tuen was practically a jungle march. From February 16th to March 6th we were never out of the forest, except at two or three camps. The path was a narrow *paydandi* which in places had to be cleared, and almost daily we ascended and descended several thousand feet, crossing narrow ridges and steep spurs. We were told again and again that there was absolutely no road, except for men on foot; certainly it was bad! but I have yet to see the road a mule won't manage, unless of course water or snow renders it impracticable. There are several lessons to be learnt from a march of this kind. The first is: never believe that a road is impracticable, when you have only untrained native report to go on. The second: in Indo-China always equip your followers with *Dahs*. Thirdly have occasional quinine parades, and as far as possible issue tea to the men and encourage them to make bonfires at night. With these precautions you may hope to reduce your fever list. At Mong Tuen we again fell in with the Siamese, and here I must describe a little incident, for it has a moral. Mong Tuen was undoubted British territory, and the presence of the Siamese for certain reasons was undesirable, so our Commissioner, Mr. Elias, requested them to leave at once, and at the same time ordered the *Paw Mong* or Tehsildar to come and pay his respects. This individual proved contumacious, and openly affirmed that he was a servant of the Siamese. The Commissioner therefore determined to seize him. He lived in the middle of the town some way from our camp, and as it would have been impossible to surprise and catch him during the day, we arranged to make a raid on the place just before daybreak. We had only 35 police sepoys, but we were completely successful. The effect was magical. The town was at our feet, and the Siamese, who were some 200 strong, made themselves scarce in three hours.

Mr. Scott at Kaing Tung also met with an interesting little adventure. One of his Panthay mule drivers strayed armed into the Palace yard. For this breach of good manners the *Sawbwa* in a fit of passion shot him with his own hands. The man was only wounded, but Mr. Scott promptly demanded compensation. The *Sawbwa* declined to see Mr. Scott, and for two days his ministers argued the point with some heat. At length Mr. Scott threatened to use force. He had only 40 men and he was in the midst of a town of 7000 inhabitants, but nevertheless the fine was promptly paid and the *Sawbwa* became our humble servant.

I relate these incidents because I think the moral they convey is a useful one. It is not unlikely that some of you will one day have to deal with these races. If so bear in mind that, as long as you confine yourself to protests, requests or arguments, the Indo-Chinese race will bluster with the best, and obstruct you in every possible way. The moment you use or threaten force opposition collapses.

Let me here relate an episode from Garnier's campaign of 1873 in Tonkin. Garnier, as most of you know, was sent to Hanoi on a diplomatic errand. He soon found it was useless to argue with the Mandarins; he therefore determined to seize Hanoi, a walled city the size of Mandalay. He had only 2 small gun boats and less than 200 men, but he took the place *without losing a man*. He then sent off one of his gun boats under Sub.-Lieut. Balny to subjugate the towns in the southern half of the Delta. As he could get no news of Balny's operations, he despatched Midshipman Hautefeuille in a steam launch to communicate with him. On arriving at the big walled city of Ninh Binh, this youth not being a diplomatist and not knowing the language, thought the best thing he could do was to take the place. He had one small boat gun, 8 French sailors, and two natives. He opened fire with his 1½ in. gun, and then disembarking with 6 men stormed and took the city!!

With all our own wonderful history of conquest we cannot cap this astonishing achievement. To find a parallel we must go back to the exploits of Cortez in Mexico. The gallant Garnier was killed shortly afterwards. I dont know what has become of Midshipman Hautefeuille but he ought to be either an admiral or an angel! My reason for introducing this story is of course obvious; it emphasizes what I have already said regarding the way to treat the Indo-Chinese race. Remember Midshipman Hautefeuille! Whatever the odds may be—strike! You are bound to win. Make up your mind as to what you want and insist on getting it. Never argue!

From Mong Tuen we made our way back to Burma *via* Moné and Toung Gyi, reaching the railway on April 15th.

As I have already told you, the country on the far side of the Salween is mostly forest and has but few attractions except for the botanist or the entomologist, so I will not weary you with an account of our wanderings. Our personal baggage and tents were carried by mules, and these animals I may remark throve excellently on paddy and bamboo. We started with 100 mules and we returned with 99 in fine condition, fit to march the next day for Lhassa or Herat. Our supplies were carried throughout by Shan bullocks. These animals, though slow and only able to do 8 or 10 miles a day, afford excellent transport for troops, as they feed themselves in the jungles and require comparatively few men (1 to 5 or 7) to look after them. Their chief drawback is that they only carry 120 lbs. and that their gear is ill adapted to bulky loads. To see these bullocks swimming a broad river like the Salween is a marvellous sight. One of the drivers first crosses over and halloos to them, then the bullocks are all driven into the water together, and swim across in one great bunch, whereas our transport mules always gave an infinity of trouble at such places.

One of the most interesting problems in connection with the trans-Salween States is the development of commerce with China, and as this depends largely on the nature of the communications I will consider these two subjects together. We have now a good cart road reaching to the Shan plateau at Kalaw, 60 miles from the railway, and which it is intended to carry on to Moné through Bawyetát and Toung Gyi. At Bawyetat an unmetalled cart road branches off southward to Fort Stedman, 10 miles distant. From Moné there are very fair pack roads leading to the Salween at Ta Kaw and Ta Hsang, which are respectively the ferries for Kaing Tung, and Chieng Mai.

The country beyond the Salween is traversed only by a few indifferent pack tracks, and it is this want of good communications that prevents a comparatively extensive trade springing up. A good pack road from the Ta Kaw ferry to Kaing Tung would ensure the command of the trade between Yunnan and Siam, would place us in a position to develop the tea industry of Kaing Hung, and would give us a fairly good trade route connecting Yunnan and Kaing Hung with the Burmese Railway system. The Yunnan-Siam trade is even now not inconsiderable. It follows the line Szu Mao—Kaing Hung—Kaing Tung—Chieng Hai—Chieng Mai; so that north of Kaing Tung this traffic would profit by any steps we took to improve and protect our own trade route. The tea industry of the Sip Song Panna is believed to be capable of indefinite expansion, as the so-called Puerh tea commands a high price throughout China, and with improved communications and security for trade might possibly command a market in Siam and Burma. Some of it even now, Mr. Elias tells me, finds its way through Rangoon, India, and Ladakh to Yarkand, a sure proof of the value placed on this Puerh tea.

From Moné to Kaing Tung by the Ta Kaw ferry it is 186 miles, and there is no doubt that a very good pack road could be made at a comparatively small cost. The highest point the road would cross is 6,000 feet; its general elevation would be about 3,000 feet. From Kaing Tung to Kaing Hung it is 132 miles. The difficulties attending the construction of a good pack road would probably not be greater than those on the Salween-Kaing Tung section. Anyhow, by the improvement of less than 320 miles of pack road we should obtain a fair military route to the McKhong and one which would probably attract much of the trade that now goes to Canton and Shanghai. From Kaing Hung to the railway *viâ* Moné and the cart road it is about 500 miles From Kaing Hung to Shanghai it is certainly over 2,000, of which more than half is by road, while to Canton it must be close on 1,200 miles, of which not more than half would be by water. In fact, it seems quite certain, looking at these distances, that the Puerh tea could be laid down far cheaper at Canton or Shanghai through Rangoon than direct, if we only offered the facilities of a good and safe pack road to the Salween.

As regards railways there was a time when it was supposed that Yunnan was a country of boundless riches, but as a matter of fact, except for its undeveloped mines, the country is on the whole a poor one, and it is very doubtful whether an expensive railway line into the heart of Yunnan would, commercially speaking, pay its way. South-western Yunnan is certainly a poor and mountainous region, and south-eastern Yunnan is, it seems, equally barren. On the whole, the richest part of the country appears to be South and Central Yunnan—that is, the country between Yunnan-Fu and Szu Mao (Esmok); and if a railway is ever to be made, it is this district which it should tap.

There are, or have been, three distinct projects, which may be called respectively the Bhamo scheme, the Kun Lon ferry scheme, and the Hallett-Colquhoun scheme. The Bhamo idea—for it can hardly be called a project—is no longer tenable. Regarding it the late Mr. Baber said :—

"I do not mean that it would be absolutely impossible to construct "a railway. By piercing half-a-dozen Mont Cenis tunnels and erecting a "few Menai bridges, the road from Burma to Yunnan-Fu would doubtless "be much improved"

This description exactly expresses the nature of the country; for on the Bhamo route between Moulmein and Tali-Fu there are seven main ranges varying in height from 6,900 ft. to 8,700 ft. while the valleys between them are from 2,000 ft. to 4,000 ft

The distance from Bhamo to Tali by the existing pack road is 295 miles; a railway would of course cover far more ground, and the idea of making a line through such a country may be dismissed as a visionary one.

The Kun Lon ferry scheme is that advocated by Mr. Bagley, Executive Engineer. He says that the examination of the country made so far, shows that there is only one route by which a first class railway can be constructed, namely, up the Myet Gné valley *viâ* Thebaw and Lashio to the Kun Lon ferry, 340 miles from Mandalay, thence up the Nam Ting valley towards Shunning-Fu. With this route Mr. Bagley considers no possible line from the south can compare. But this line in my opinion strikes Yunnan much too far to the west, and, moreover, the difficulties from Shunning Fu onwards to Yunnan Fu would probably be enormous.

The third project is that known as the Hallett-Colquhoun scheme. With its base at Moulmein this line would cross the low mountains separating Burma from Siam, strike the MéPing at Raheng, and thence follow generally the lie of the drainage towards Kaing Hung, never rising above 2,400 ft. This scheme of a railway from Moulmein to Raheng in Siam has for some years been before the public, but has met with but scant approval both on account of the difficulties and expense attending the construction of a line across the Salween-Mé Nam watershed, and because it is felt that the bulk of the trade will naturally follow the valley of the Mé Nam to Bangkok. As a military and strategical line it would have practically but little value for us, while, regarded as a line of approach to Yunnan, the distance makes it extremely problematical whether it could ever pay. It would mean about 700 miles of construction, of which a considerable portion would be in a hilly country. If some private company likes to construct the Moulmein-Raheng line so much the better, but public money would be far better spent in making a line to the Cis-Salween Shan plateau.

If feasible, a short direct line from Burma *towards* not *to* Kaing Tung would serve British interests far better, for a line from Moulmein to Kaing Hung bears the fatal objection of lying almost entirely in foreign territory. A direct line, even if it only went half way to the Salween, would certainly be more useful to us in a military sense. From Moulmein to Raheng it is 160 miles through a hill country. I feel sure 160 miles of rail from the Burma railway eastwards would cost no more and be far more useful to us. With this in view, I anticipate that the easiest and best line of approach will be found to be from Pyinmana, half way between Rangoon and Mandalay, up the Sittang or Poungloung valley to Thamakan and Pwehla This would bring the line up to 4,000 ft. in about 100 miles, and would facilitate the establishment of a hill sanitarium for the Burma garrisons about Kalaw or Pwehla From its oblique north-easterly direction it would enable us to throw troops either into Karenni or the Southern Shan States without much difficulty, while if continued towards Legya we should gain a central position in the Shan States dominating the whole country from Thebaw and South Theinni to Moné, and would intercept every trade route to Burma, from Kaing Tung or Chieng Mai. At Thamakan the line would be within easy distance (three marches) of either Fort Stedman or the new head-quarters, at Toung Gyi. Finally Legya is on the easiest and best route to the Ta Kaw ferry, so that if we ever wanted to extend the line to the Salween at that point, we should be in the best position to do so. The distance from Legya to Moné is 60 miles, to Ta Kaw less than 80, while at Legya we should be within 180 miles of Kaing Tung, and almost any place in the Shan States except Theinni would be within 12 marches of the railway. I would however deprecate carrying the railway further towards the Salween than Legya for the present, as an easterly direction would take it across three deep lines of drainage, namely, those of the Nam Teng, the Nam Pan (Ben Chaung), and the Salween. The expenses of construction and bridging on such an alignment would be enormous, and quite out of proportion to any benefits which might accrue from a railway to the Salween, for I do not believe that even the trade of Yunnan would at present recoup the cost of such a line. The fact is the trans-Salween States and even Yunnan are, considering their extent, very thinly populated countries, and before a railway in these parts will pay, it is necessary to create population, A railway to the centre of the cis-Salween States is a different thing. It is desirable on military grounds, it bridges the unhealthy Terai which fringes the plains of Burma, and it will certainly in conjunction with pack roads as feeders attract much trade that now goes to Shanghai, Canton, or Bangkok Above all, it will enable us to compete with the French for the inland trade of western China

The next subject of interest in connection with this trans-Salween country is the French advance, but on this subject I must obviously confine myself to a few general remarks.

In 1862 the French occupied Cochin-China with the expectation that the McKhong would afford a great waterway by which the trade of Yunnan could be diverted from Canton and Shanghai. This hope proved delusive owing to the innumerable rapids which impede the navigation of that river. They then turned their eyes on the Song Koi or river of Tonkin, which was also supposed to be a possible trade route from the sea to Yunnan. Again they were doomed to disappointment, as the Red River or Song Koi soon becomes innavigable; hence the persistence and energy with which they have pushed their explorations and expeditions across the mountains towards Luang Phra Bang and the valley of the Nam Hu. They still seem to hope that a good practicable trade route may be found which will open up for them the commerce of Yunnan. I am not at all sure, though, that the Red River will not after all prove the most feasible route. A recent French report shows that, by dredging, blowing up rocks &c. and using steamers of a suitable description, this river may be made navigable for steamers as far as Laokai. Thence to Manhao in Yunnan, Chinese boats can ascend in five to seven days, while from Manhao to Mong-Tsé, a large Chinese city and mart, it is only two days march. At Manhao there is a French consul, and the place is now connected by wire with Laokai. Even since I prepared this lecture I have read the news that a steam service with Laokai has been successfully inaugurated..

As regards the present position of the French. It was supposed that for some time to come they would find ample occupation in Tonkin, but it seems that they have passed over the SongKoi watershed into the basin of the Nam Hu. They have it is said annexed the Sip Song Puthai, a district, south-east of the Sip Song Panna. The Sip Song Puthai was once a prosperous and populous tract of country, which paid tribute to China, Siam, and Tonkin alike, but some few years ago the Haws or Black Flags occupied and devastated the country. These in their turn were driven out by the French, who in 1888 formed regular cantonments at Mong Teng and Mong Lai (or La), where they stationed comparatively large garrisons. No doubt the primary object of the French is to acquire the left bank of the McKhong as a western boundary for their vassal State of Anam, and with this in view their immediate aim appears to be a district to the East of Luang Phra Bang called Mong Puen, which is described as a fine open rolling country about 5,000 ft. above the sea. From a healthy position such as this affords, they will acquire a complete command of the McKhong water-way from Luang Phra Bang downwards. The trade route to the eastern Lao States for British or Burmese goods lies through Luang Phra Bang, so that before long we must expect at least to lose the market for our goods that Luang Phra Bang now is. Now however unimportant the MeKhong trade may be to us, we have very considerable potential interests in the Yunnan question. The country stretching from Kaing Hung to the Pu Erh district of Yunnan is a great sea tract, and if an easier trade route than the present long and devious one through China is opened up, it is extremely probable that this tea trade will be diverted to the new route. Naturally the French wish to attract this trade to themselves, and if once a considerable trade does arise, Kaing Hung will possess a value which may well tempt the French to acquire and consolidate a position in the Shan States on the McKhong. Herein it seems to me lies the only danger.

As I have already told you the French military force in Indo-China is not a large one. It consists altogether of about 14,000 Europeans and 20,000 natives, and I doubt very much if out of this number they could put 10,000 men into the field. On the whole, though we may have reason to dread French commercial rivalry, I don't think we have at present any other cause for anxiety.

As regards the Chinese I must say a few words. The immensity of China has exercised a fascination on the minds of men, and we are constantly reminded of the so called Chinese factor. Before the annexation of Burma there was a sort of nervous feeling that Upper Burma must be retained as a buffer state, and that once we were conterminous with China, we should be landed in all the difficulties attending the defence of another long land frontier. Well, gentlemen, I believe these fears are entirely groundless. China from a variety of causes is powerless to invade us, and the defence of the Chinese frontier is no more difficult a task than the defence of the Nepal border. The only invasion to be expected is one which we should perhaps welcome, namely that of traders and colonists.

There are two other topics of interest to which I may allude. The first is the question of a hill station for Burma. I am convinced that numerous excellent sites may be found on the Shan plateau at an altitude of 4000 ft. or even 5000 ft., and I would particularly commend to your notice Kalaw a picturesque, well wooded, well watered, undulating site 4500 ft. above sea, only 60 miles from the railway at Mektila Road, and connected with it by a splendid cart road. We have now three batteries of British infantry holding the line Rangoon—Toungoo-Mandalay. It would be an immense advantage if we could withdraw one of these battalions to a healthy site on the plateau. The Mission was at Kalaw in April, the hottest month of the year, and I can assure you that even then the climate was cool, and the air bracing. The minimum temperature in my tent during the twenty four hours was 62°, the the maximum 90°, although my tent was not in the shade. Of course there is at present one great objection to placing British troops in the Shan hills. It is that they are cut off for 7 months of the year by the intervening Terai, the deadly nature of which during the rains renders it impracticable for the march of troops. When, however, a railway reaches the plateau this objection will disappear.

The second topic which I wish to bring to your notice is the military value of the Shans and Karens. I think I am correct in saying that Government at one time hoped it might be able to utilize these races in forming local corps. It would be an immense political and financial advantage if we could do so, and I am sorry to throw cold water on the idea, but contact with the Shans has led me to conclude that they have even less courage and aptitude for military service than the Burmese. Had it been otherwise the Burmese would never have lorded it over them as they did. As for the Karens, they certainly stood to fight us at Nga Kyaing, but I believe it was the resistance of ignorance. Hitherto they had had only cowardly Shans to deal with. Artillery, mounted soldiers, and rifle fire were revelations to them, and I feel sure they would never stand against us again. However it is possible that, as regards the Karenni or Red Karens, military service might, as in the case of the Bheels, prove useful as a civilizing agency, and the experiment might perhaps with advantage be tried, but we must not expect to obtain *soldiers* in the proper sense of the term.

I will now conclude by recommending you to give some attention to Indo-Chinese affairs. The annexation of Burma and the conquest of Tonkin mark the dawn of another epoch of European rivalry in Asia. It may be a peaceful one, but we should not ignore the possibility of the events of the Carnatic repeating themselves in the valley of the MéNam. Should that day come, may another Dupleix find himself confronted by another Clive.

THE DIFFICULTIES ATTENDANT ON ASSUMING THE INITIATIVE IN MODERN EUROPEAN WARFARE.

A paper read at the United Service Institution, Simla, on 10th September 1890, by Captain C. M. Maguire, 3rd Cavalry, Hyderabad Contingent.

Major-General W. K. Elles, c. b., Adjutant-General in India, in the chair.

General Elles, your Excellency, Ladies, and Gentlemen. As the consideration of the subject of my lecture includes a review of the opening operations of a modern campaign, I must commence by craving your indulgence for the many shortcomings there must be in the treatment of such a very difficult subject. My excuse for undertaking to speak on it is, that I have visited two of the great military frontiers of Europe, besides which I can plead its general interest, and the fact that it has not previously been the subject of a lecture before this Institution. However difficult a subject may be, its consideration will place before us many of the problems that have to be solved, which is the first step towards their solution.

The interest of the subject.

*[Though continental warfare is of less immediate interest to us English, than to the other European nations, the armed peace prevailing on the continent is too burning a question not to affect a power of world-wide interests, like ours, at least indirectly. We have so long formed part of the European comity of nations, that sentiment alone will prevent us from regarding a great European war with indifference.

The value of theory.

If the value of a discussion, a great part of which is involved in theory, be questioned, it may be argued in reply, that it was by forming tentative conclusions based on careful theoretical study that the Germans were able to prepare detailed plans of operations, and to impart a training to their troops, which enabled them after fifty years of peace to inflict during the space of five years crushing defeats on two of the greatest military empires in Europe.]

The changed conditions of contemporary warfare.

Probably at no period of the world's history has it been more difficult to foretell the issue of a great European war than at present. During the last twenty years the general adoption of universal service by the continental nations has caused a development of armed forces that has no parallel in history. The increase in the numerical strength of modern armies has completely altered strategy. The rules which held good at the beginning of this century for armies of one or two hundred thousand proved inapplicable to armies of four or five hundred thousand in 1870, and no doubt further changes will be necessary in dealing with armies of over a million.

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* Those portions enclosed in brackets were omitted from the lecture.

Tactics have altered too and become more dependent on strategy. The introduction of breech-loading arms has effected a revolution, while the numerous more modern inventions in the art of war, machine guns, magazine rifles, smokeless powder, and military balloons, will all exercise their influence in the new warfare. But though tactics have been altered by recent changes in materiel, the characteristics of the battle, of modern times have been still more affected by the enormous number of combatants engaged, and the consequent great extent of the battlefields. A modern battle presents the aspect of a series of independent engagements rather than a harmonions whole planned by one master mind, such as Austerlitz, or Wagram.

Contrast between a modern action and one at the beginning of the century.

[Military history affords no more complete contrast than that which exists between one of Napoleon's great actions and Gravelotte. In the former the key details of the action were worked out by the great Captain himself, and precise orders were issued to the subordinate leaders, who remained subject to his control throughout the day. At Gravelotte, on the contrary, it is impossible not to remark the absence of a Commander-in-Chief. The strategical unity of command so conspicuous in the German dispositions during the campaign of 1870 was replaced by an almost casual permission to subordinate commanders to shift for themselves. To this absence of superior control are to be ascribed the heavy losses sustained by the viith and viiith corps on the German right, for which General von Steinmetz was subsequently removed from his command, and the extremely critical position taken up by the ixth German corps, which carried out an independent attack on the French centre. It is true that this want of combined action was less noticeable at Sedan than at Gravelotte, but in the former engagement the forces on both sides were much smaller than in the latter, while at Sedan, owing to the supineness of the French cavalry, the Germans were much better informed as to the dispositions, and numbers of the enemy than in the earlier part of the war.] In the warfare of our day, in which the number of the combatants in decisive actions will make engagements such as Sedan appear skirmishes, it is probable that it will be still more difficult than it was in 1870 to impart a unity of direction to the entire battle. Even assuming that a great improvement will be effected in military ballooning, the extent of the battle-field would prevent a commander from altering his dispositions according to the course of the engagement. The difficulty of subjecting large bodies of troops in action to individual control has caused strategy to exercise a direct influence in tactical crises. A general view of the campaign of 1870 can hardly fail to impress us with the fact that the German tactics were the outcome of their strategy. Just as their strategical advance from the

The necessity of subordinating tactics to strategy.

east and north-east enveloped and outflanked the divided portions of the army of the Rhine, so in every action the German troops outflanked the French, as at Worth and Gravelotte, or completely surrounded them, as at Sedan. Still the tactical combinations of the campaign do not possess the completeness of the strategic design. It is no doubt true that superior numbers enabled the Germans easily to obtain those tactical successes which were necessary to give full scope to Marshal von Moltke's strategy; yet, while making allowance for the imperfect character of the experience furnished by the Franco-German war, it may be assumed that the increased difficulty attendant on the tactical control of armies has imparted a greater significance to strategy than it has hitherto possessed, as it is in this part of the direction of a campaign that the control of the commander can best be exercised, besides which, while the tactical issues of modern campaigns are more or less subject to the influence of new technical inventions, the precise effect of which can only be determined during the course of operations, strategy, though it avails itself of all the improved means of communication of progressing modern times, has to deal at the commencement of a campaign with certainties and acts on plans which can be carefully matured beforehand.

Measures taken by European nations to adopt their armies to the changed conditions of warfare.

Thus we find that, in order to be prepared for the strategic, and tactical emergencies of modern warfare, European nations have established General Staffs to deal with the strategical problems affecting their countries, while, by adopting a complete decentralisation, and a distribution of authority among subordinate commanders, in fact by dividing their armies into more or less independent sections, they have endeavoured to obviate the necessity for a central authority during tactical crises. The tendency in modern times has been to subtitute an elaborate military system for measures taken on the occurrence of an emergency, or the dependence on the appearance of a military genius in times of national danger. This results no less from the considerations connected with the new conditions of warfare, than from the fact that the safety of a modern state has become too vital a question to be allowed to depend in any way on chance. The strategy of modern warfare during the earlier operations of a campaign does not offer the same scope for genius as that of former times. The influence of existing communications, and the exent of the area required for the operations of large forces, necessarily limit the number of alternative courses open to the strategist, while the great detailed labour, necessary for a successful mobilisation and concentration, requires decentralisation and the substitution of a number of able commanders for one great leader. The military machine has become too large for individual influence to make itself directly felt: the man gives place to the system. According to Napoleon III, who had at least the advantage of speaking from experience, a nation requires a military system that can be relied on to act well in war, because it has been thoroughly worked out and tested during peace. In our days military genius will find its most effective field in tactical struggles, as they will contain most of the unforeseen element in warfare. Its influence will no doubt make itself felt by infusing enthusiasm into masses of troops, which was Napoleon's most striking gift. This influence has become more difficult to exercise, as the sphere over which it has to be diffused has become so much more extensive. It is, however, justifiable to anticipate that, in armies with a war establishment of some forty thousand officers, more military genius will be developed than heretofore, and that three or four great leaders will be able to exercise the same influence over a modern army as Napoleon did on the smaller armies of his day.

The extent to which strategy is uninfluenced by tactics.

As this lecture is concerned more especially with the strategy of a modern campaign, it is necessary to consider how far it is possible to study the subject without being confronted by tactics.

In his introduction to the history of the Franco-German war Marshal von Moltke says :—" When an army first takes the field manifold political and geographical considerations, as well as the purely military, have to be weighed. Errors in the original concentration of the army can scarcely ever be made good during the course of the campaign. All these arrangements, however, may be considered long beforehand, and, assuming that the troops are in readiness for war, and the transport service organised, they must lead to the result which is contemplated.

It is otherwise with the subsequent task of strategy, that is to say, with the adaptation of the means thus prepared to the purposes of war—the operations.

In this case we have to grapple with the ememy's opposition. It may of course be limited in its effect by our ready and resolute initiative, but it cannot be crushed except by battle.

The material and moral consequences of every great battle are of so comprehensive a character, that they commonly produce an entire change in the situation, and with it a fresh starting point for new measures.

Strategy is affected by the first collision with the enemy's main forces.

No plan of operations can with any safety include more than the first collision with the enemy's main forces. It is only the laity who believe that they can trace throughout the course of a campaign the prosecution of an original plan, arranged beforehand in all its details, and observed to the very close. The Commander-in-Chief most undoubtedly will, in spite of the changing fortunes of war, always have the main object of the campaign before his eyes, but the means by which he hopes to attain it cannot be sketched out with certainty long beforehand."

The operations preceding the first serious action.

Thus, that part of a war which precedes the first collison with the adversary's main forces is removed from the value of conjecture, in which the subsequent operations of a campaign are shrouded.

In it are included :—

The mobilisation.
The concentration.
The operations prior to the first serious engagement.

As the plans for these operations exist during peace the can be conjectured.

The General Staff of each of the great powers has drawn up carefully detailed plans for the action of its forces in all possible circumstances under which war may present itself, and, as we are in possession of more or less accurate information as to the geography, means of communication, and statistical data, upon which these plans are based, we can estimate fairly correctly the *possible* action of a European power on the outbreak of war. The *probable* action, depending as it does on alliances, policy and other non-military considerations, cannot be so easily determined.

The campaigns that have taken place under modern conditions.

Since the adoption of universal service in Germany there have been three great European wars, those of 1866, 1870, and 1877.

Unsatisfactory nature of the experience with regard to anticipating the course of future wars.

It is unfortunate, for the purpose of deductions as to the probabilities of future warfare, that the conditions at the commencement of the first two campaigns cited were so different from what might be anticipated on the outbreak of a war between the respective powers in the present day.

The campaign of 1866.

In 1866 there was little numerical difference between the Prussian forces in the eastern theatre of operations and the Imperial Austrian army of the North.

The respective fighting effectives were :—

The Austrian army of the North and the Saxon army	271,000
The Prussian armies	278,000

There was, however, a great actual difference between the forces, as the Prussians were armed with breech loaders and the Austrians with muzzle-loaders

The campaign of 1870.

In the campaign of 1870, though the French were slightly better armed than the Germans, their numerical inferiority was most marked. At the beginning of August 1870 the German field army was 519,100 strong while the French was 272,000.

The difficulties attendant on operating on exterior lines in the warfare of to-day.

Germany's tactical superiority in the campaign of 1866, and her numerical superiority in the Franco-German war, enabled her to make use of exterior lines of operation, which have been so strongly condemned by the strategical writers of Napoleon's days, and proved inapplicable to the then prevailing conditions of warfare by the successful opposition offered by the Emperor to forces operating on them in 1814. The Prussian strategy was attended by complete success, though, in the 1866 campaign, the critical position of Prince Frederick Charles' army during part of the battle of Koniggratz showed that the system has its disadvantages even under modern conditions. No doubt, in future campaigns, the general adoption of universal service will render it difficult for an invader to develope a very great superiority of force over the defensive, so the difficulty of assuming the initiative has increased. The impossibility of supplying from the resources of the theatre of war the very large forces that will be required to undertake the invasion of a country whose inhabitants have been trained to arms under universal service, as well as the great area required for the deployment of the invading army, will induce it, even though its advance will be accompanied by railways, to occupy the largest possible front, and therefore to operate on exterior lines. This strategy, which is the best when the total defensive force is not much superior to either of the forces operating on the exterior lines, as was the case in 1870, becomes dangerous when the defence is able to concentrate superior forces against one of the invading armies. In a struggle between two modern European states this can nearly always be effected, as there is no striking disparity in the forces of the first-class powers, and the concentration, and supply of large forces for decisive tactical actions can be more easily effected by the defensive than the offensive, as the inherent advantages of the former rôle are the possession of railways in full working order, and a superiority in available resources within the theatre. We must therefore conclude that, unless an invader is sufficiently strong to take advantage of the opportunities that may present themselves for an enveloping tactical attack on the defensive, operations on exterior lines will not be attended by success.

The difficulty of assuming the initiative considered with reference to Germany and France.

[The difficulties attendant on modern offensive warfare will be apparent, if we consider an attack by Germany on the present frontier of France.

Each power has at its disposal about two and three quarter millions of trained soldiers.

In both countries localisation has been thoroughly adopted, so that there would be little appreciable difference in the time required for mobilisation. It would, however, be otherwise as regards concentration. Germany has fourteen lines of railway available for a concentration against the Lorraine frontier of France, while but three French railways lead to the same frontier. Thus, on this side of the theatre, the initiative is secured to the Germans. But, during the campaign of 1870, the Germans experienced great difficulty in supplying 500,000 troops along the present eastern frontier of France. If it be considered that, under the present tactical conditions for the offensive, it would be impossible to undertake the invasion of such a country as France with less than two millions of soldiers, it will be apparent that such a host could not operate in the space between the frontier of Luxemburg and Belfort; as, apart from the difficulty of providing sufficient railways for its supply, there are not sufficient available roads to enable an advance to be carried out in such a formation as to admit of a timely deployment for tactical encounters.

Measures likely to be forced on Germany by the large armies that she must employ; their danger.

Therefore, if Germany is acting by herself, circumstances will compel her to violate the neutrality of Belgium, and perhaps, (though this is less probable owing to geographical considerations) of Luxemburg also. Germany has three railroads available for a concentration against the northern frontier of France, while the French have nine leading to the same frontier. The French deficiency in railway communication to their eastern frontier is compensated for by the existence of an elaborate system of fortress defence, on which upwards of two hundred millions of pounds sterling have been expended since 1870. It consists of two main lines of fortresses with the great entrenched camp of Paris as a reduit. Hence it will be possible for the French to detach sufficient troops to contain with the aid of their fortresses the German troops operating against their eastern frontier, while by the use of their superior means of communication, they can concentrate superior forces to anticipate the invading army advancing though Belgium, and thus gain a favourable opportunity for winning a tactical success.

The complicated nature of the problem.

The possibilities of European warfare offer no more complicated strategical problems than that under consideration, as the course of operations would be affected by so many factors of which there is so little previous experience.

An isolated struggle between two nations improbable in the future.

Since 1864 there has been an increasing disinclination among the European nations to allow the settlement of differences between powers to be adjusted without the general sanction. The recently concluded triple alliance, and whatever secret combination there may be to act as a counterpoise to it, render the occurrence of a general war more probable than an isolated struggle between two opponents. This probability is intensified by the fact that a war between any two powers would most likely be the signal for mobilisation in the neighbouring states, which would render them more likely to take part in the struggle. While it is true that treaties are only binding to the extent to which they suit the interests of the contracting powers, it is difficult to imagine any circumstances, the occurrence of which in the near future would prevent the two central European powers from acting together, and there seems to be every probability that Italy will remain true to the triple alliance, though her interest in doing so appears more remote.

Possibilities in a struggle between allied groups of nationalities.

Should the triple alliance take the field against France and Russia, the menaced frontier of France would be extended to the Mediterranean, and the question would arise whether the neutrality of Switzerland would be respected. The allied powers dispose of some five millions of field troops. Their position on interior lines within the general theatre gives them opportunities for detaching a containing force against one of the opposing powers, while operating on exterior lines with the requisite superiority of force against the other. As Colonel Maurice has pointed out, the excellence of the German railway system will enable large masses of troops to be transferred from one side of the general theatre to the other during the course of operations, and thus render it possible to impart at will to either of the operating forces the overwhelming numerical strength that appears to be required for a great tactical success.

The importance of railways has increased the influence of neutral states.

Owing to the enchanced influence of railway communications, the attitude of the neutral powers will exercise a great influence on the course of operations. It is an inherent advantage of the defensive, that a zone exists between two operating forces, in which the railways are destroyed, the offensive being obliged to reconstruct them as he advances. In the case under consideration, were the neutral powers to destroy their railways, which both in Switzerland and the Low countries would take long to reconstruct, a deficiency of transport and supplies would for the time being render an invasion of France impossible.

The influence of fortresses.

Another uncertain element in the warfare of the future is the influence that will be exercised by fortresses. It is incontestible that the strategic value of fortresses, as barriers governing lines of communication, has very greatly increased of late years. The advance of a modern army must be accompanied by railways; therefore fortresses commanding defiles can bring an invading force to a halt. Masking or observing fortresses of the modern type, with strong mobile garrisons, requires the detachment of such large forces, that the advancing invading army may be dangerously weakened, as the total available force of the invaders will seldom be much greater than that of the defenders.

The fortress defence of the Lorraine from the side of France.

The French first line of fortresses leaves an open space of twenty miles between the frontier of Luxemburg and Verdun. From Verdun to Toul is fortified, then occurs another gap of some twenty miles, as far as Epinal, whence another fortress system extends as far as Belfort. It does not appear possible for the Germans to advance into France without attacking one or other of these fortress systems.

Disputed nature of the tactical value of fortresses.

The tactical value of fortresses is a subject concerning which there is much dispute. Unfortunately this part of modern warfare is still in the domain of theory, as there has been no instance of the siege of a modern fortress. The siege of Strasburg, which had been fortified by Vauban, is in its results favourable to the defensive, but the value of the experience is reduced by the fact that political reasons led to a suspension of the bombardment and thus delayed the fall of the place.

The arguments in favour of the offensive.

Some artillery officers are of opinion that the great improvements that have taken place in artillery materiel, and practice, and the introduction of new explosives, will render it impossible for the fortress materiel to withstand bombardment.

Those in favour of the offensive.

Others maintain that the defensive advantages of storm-free positions, and superiority in number and calibre of guns, as well as those conferred by the possession of reliable maps, measured ranges, and the experience gained from peace practice within the fortress rayon, will enable the defensive to take a better part in the artillery duel than heretofore. The improved mechanical appliances, and machine and quick-firing guns are in favour of the defensive in fortress and position warfare, as their value is prejudicially affected by mobility, the necessary condition for the materiel accompanying field armies.

Theory assigns a further advantage to the defensive. The value of carefully constructed earth-works so abundantly proved at Plevna, renders it possible for the besieged to construct advanced positions for their infantry under the support of the fortress guns, and so dispute the possession of the ground required by the besieger for his first artillery position. Such earth-works offer a poor target to artillery fire, and those at Plevna were only taken by starving out the garrison. The reduction by famine of fortified positions, with a fortress as a nucleus, would be a long and difficult operation, as it would involve the investment of a periphery of some thirty miles. The offensive advantage that, owing to the enveloping nature of their position, investing forces may be much weaker in proportion to the force invested than formerly, as in the case of Metz where 173,000 French were hemmed in by 200,000 Germans, has been neutralised by the great size of the rayons of modern fortresses. It is now considered that a close investment is not a necessary part of a modern siege. A regular attack will be made on a certain section of the fortress rayon, while cavalry divisions supported by mobile infantry forces will endeavour to destroy the communications and harry the defenders in the remainder of the periphery. As an example of the increased difficulty of investment, it may be instanced that Paris, the fortress rayon of which was thirty-four miles in 1870, has now a periphery of 104 miles, the close investment of which would require a force of about a million infantry, which renders it under present conditions an impossible operation. Thus, while the assailant owing to his inexhaustible resources must eventually be able to subdue the defender's resistance, a considerable time may elapse before he can gain a position from which to open an effective fire on the fortress. As the value of fortresses in warfare is measured by the time necessary to subdue them, such a delay would be quite as valuable to the defence as a greater resisting power in the fortress materiel. Thus siege operations are likely to become as tedious and necessary in our days as they were in the wars at the beginning of last century. This is doubtless one of the reasons why Marshal Von Moltke said the other day that a thirty years war might again take place.

Surprise appears the best solution of the fortress difficulty, a siege train a necessary portion of a field army.

The offensive will probably find the solution of the fortress problem in surprising the defensive, and seizing the site of their first artillery position, before it has been entrenched and occupied. A siege train will henceforward form a necessary portion of a field army, and its transport will add great additional difficulty to the offensive rôle

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* NOTE.—Those interested in the question of modern fortress warfare will find it ably discussed in two papers on the strategy of fortress warfare translated from the German for the R. E. professional papers by Major Clarke and Captain Nathan, to which papers I am much indebted.

General conclusions.

The foregoing considerations enable us to conclude that the execution of such strategic combinations as that included in the Prussian operations in 1866, in which two armies advancing from different directions were to effect a junction within hostile territory, has become more uncertain, while the necessity for dividing an invading force has become more imperative. It is very probable that the difficulty of assuming the initiative is the principal cause of the long peace Europe has now enjoyed.

Necessity for endeavouring to assume the initiative. An example.

Notwithstanding this, when war does occur, the initiative, which obliges the defensive to conform to the movements of the offensive, and makes the enemy's country the theatre of war, has so many advantages that any risk will be run to secure it. Moreover, the question is seldom determined upon purely military considerations. For instance in 1870, so much political pressure was brought to bear on the French authorities that, though they were well aware of the numerical inferiority of their forces to those of the Germans, and of the defective nature of their arrangements for mobilisation, concentration, and supply, they were obliged to attempt to assume the offensive.

The Russo-Turkish war offers the best forecast of future campaigns.

The best illustration experience offers as to what may be expected to take place in the wars of the future is that furnished by the Russo-Turkish war of 1877-78, in which, owing to the fact that the numbers on both sides were approximately equal at the commencement of operations, the future strategical conditions were more nearly realised than in 1866 or 1870.

Russian dispositions at the commencement.

*In 1877 the Russians commenced operations with only a part of their available forces. This was due to a misconception of the military power of the Ottoman empire; the difficulty of transporting, and supplying, a large force from Kischineff, in itself a poor base, situated 370 miles from the Danube at Sistova, and connected with it by a single line of railway, with a break of gauge, on which only five trains a day could run; and the defective organisation of their army, in which universal service had only been adopted in 1875.

The force detailed for the invasion of Bulgaria.

The original force detailed for the invasion of Bulgaria consisted of

150,000	Infantry.
25,000	Cavalry.
20,000	Special troops.

In all 195,000 men and 800 field guns.

The full effective of this force was not present in Bulgaria till the end of August, when the tactical results of two defeats, sustained before Plevna, had decisively influenced the Russian strategy.

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* NOTE.—The account of the 1877 campaign has been compiled from Major Clarke's paper on Plevna in R. E. professional papers 1880.

The dispositions at the end of June 1877.

At the end of June 1877 the Turkish forces in Bulgaria were disposed as follows:—

(1). In the Quadrilateral

Rustchuk	33,000.
Shumla	25,000.
Silistria	22,000.
Varna	16,000.
Total	96,000.

These formed the army of the east under Abdul Kerim Pasha.

(2) In the Dabrudscha 15,000 men under Ali Pasha.

(3) At Rahova, Nicopolis, and Sistova on the Danube, 12,000.

(4) At and near Viddin the army of the West under Osman Pasha, 35,000.

The total Turkish strength in Bulgaria was 158,000 men and 300 field guns. The detachment of Osman Pasha's army to Viddin was the result of the necessity which existed for observing Servia.

Russia's line of invasion. The passage of the Danube.

The only part of the Turkish frontier open to a Russian invasion was the line of the Danube from Viddin to Braila. The Simnitsa Sistova passage was selected for crossing the river. The passage was accomplished with a loss of only 822 men on June 26th. This brought the Russians on the direct route to their objective, Adrianople, through Sistova, Biela, Tirnova, Schipka, Kazanlik, and Hermanli.

Measures after the passage of the Danube.

After crossing the Danube the Russians had to capture Nicopolis, 25 miles above Sistova, to serve as a bridge-head, to besiege or mask the fortress of Rustchuk, and press radial reconnaissances in all directions, so as to gain possession of a strategical bridge-head, within the lines of which they would have full freedom of operation.

The ixth corps was sent against Nicopolis. It was subsequently to secure the line Nicopolis-Plevna-Lovcha. The xiith and xiiith corps under the Caesarevitch, and afterwards the xith corps, were to gain possession of the Jantra from Biela to the Danube, besiege or mask Rustchuk, and to hold the line of the Lom against the army of the Quadrilateral. The centre column, consisting of the viiith and afterwards the ivth Corps, was to push forward on Tirnova and the Balkans. A strong advanced guard of some 12,000 under General Gourko was to reconnoitre the Balkan passes, turn the Schipka position, and visit the Tundscha valley. It was to be followed by the main column. Thus, of the four corps that originally crossed the Danube, only one, and a strong advanced guard, were actually available for an advance towards the objective, Adrianople.

Turkish movement. First attack on Plevna.

On the Turkish side 13 battalions advanced towards Biela, while Osman Pasha marched to Plevna. The Russians occupied Tirnova and Biela. Nicopolis was taken. On July 20th

Schilder-Schuldner's division attacked the Turks at Plevna and was repulsed with great loss.

Original Russian plans.

The original Russian plan of operations had been to detach a strong force to protect each flank, to seize, or turn, the Schipka position, and advance rapidly on Adrianople. It was probably expected that the Turks would be met with at Biela, or Tirnova, and receive a crushing defeat. Allowing two or three corps for the protection of each flank of the main advance, and the provision of strong detachments to hold the Balkan passes, and étappen stations, the original plan would have required not less than eight army corps. As a matter of fact, even six corps were not available before the middle of August.

The movement of Suleiman's army from Montenegro enables a Turkish force to dispute a direct advance on Adrianople.

By July 26th the movement of Suleiman Pasha's army from Montenegro had enabled the Turks to concentrate 50,000 troops to oppose the Russian advance on Adrianople. At this time the Turks had 230,000 troops in the field (of which however 96,000 were garrisoning fortresses) against about 120,000 Russians. Thus the weaker force was acting on the offensive though it had a longer line to maintain. The geographical conditions of the theatre also favoured the defensive, as it possessed a strong defensive line in the Balkans, and had two lines of railway to facilitate its communications.

The true influence of Plevna on the operations.

" It is generally considered that the Russian advance on Adrianople was prevented by Plevna. To form a true judgment on the subject, it is necessary to take into consideration the general strategic situation as above set down. The great tactical results of Osman Pasha's earthworks have led to an exaggerated estimate of their real effect on the course of the campaign. General Gourko's strategic reconnaissance was a decided success, but to obtain the best results from it, it was necessary that the army intended for a movement beyond the Balkans should be sufficiently strong to gain a tactical success over the Turkish forces in Roumelia, and follow it up by an advance on Adrianople. Supposing that Osman Pasha had not taken up his position at Plevna threatening the Russian bridge-head at Nicopolis, and only one army corps had been detailed for the protection of the right flank, as had been originally intended, the Russians would still only have had two army corps (some 50,000 men), with which to defeat Suleiman Pasha, and advance on Adrianople; and even this force was not available till the middle of August. As a strategical movement, the transport of Suleiman's army from Montenegro to Roumelia probably had more effect on the campaign than the occupation of Plevna. No doubt the nearness of Plevna (three days march from Sistova) increased its moral effect on the Russians, and led to the precipitate action which resulted in the second defeat."

Russian position at the end of July.

* The Russian situation at the end of July was as follows :—On the left, the army of the Caesarevitch, the xiith and xiiith corps, just reinforced by the greater part of the xith, was

operating over a very extended front. Rustchuk was uninvested, and no serious movement against Rasgrad had been undertaken. This inactivity was probably due to the expectation that an advance of the centre beyond the Balkans would have induced the army of the Quadrilateral to leave its fortresses and offer battle in the open. South of the Balkans, the arrival of Suleiman, and the defeat sustained by Schilder-Schuldner before Plevna, had caused the strategic advanced guard to retreat to the mountains.

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* See Map.

Its unsatisfactory nature apparent from Schilder-Schuldner's defeat.

Schilder-Schuldner's defeat on July 20th showed clearly the unsatisfactory strategical position of the Russians. Not only was their total effective numerically inferior to that of the Turks, but their troops were so much scattered, that they did not possess a superiority of force at any one point.

Necessity for immediate active measures.

The time had arrived for prompt energetic measures, or the initiative would be lost: a considerable force had to be concentrated and a defeat inflicted on one of the three Turkish armies without delay. Osman Pasha's was the natural force to attack. It was easier to concentrate forces against it than against the other Turkish armies, and there was no immediate danger from them. If Osman were defeated, it would be possible to re-inforce Gourko and attack Suleiman. A tactical success at Plevna had become necessary for the prosecution of the Russian strategy. The difficulty of gaining such a success was underestimated, as a force of only some 30,000 was detailed to attack an entrenched position occupied by 40,000, and the order to attack was persisted in in spite of the protests of General Krudener, the senior officer present before Plevna, who had himself executed a reconnaissance of the position.

The tactical results of the 2nd repulse before Plevna decisively influenced the Russian strategy.

The results of the second battle of Plevna were so decisive, that all the original Russian plans for the conduct of the campaign had to be abandoned.

The value of the campaign for deductions.

No doubt in the above operations the difficulty of communication had much to do with the unsatisfactory Russian dispositions, obliging them to assume the offensive with inferior forces. Yet, if we consider that the defective officering and training of their troops, and the chaotic nature of their command arrangements, prevented the Turks from making use of their numerical superiority, we must conclude that many of the difficulties experienced by the Russians are inseparable from the assumption of the initiative in any modern campaign.]

Especially in wars between nations with a frontier like that of Bulgaria *e. g.* Austria and Russia.

The Russian experiences in 1877 serve as a forecast, if allowance is made for the great numerical difference in the armies, of the opening stages of any European war in which the frontiers of the opposing states are not very angular. Perhaps the conditions are most similar to those which would influence a war between Austria and Russia. To appreciate the resemblance it will be necessary to consider briefly the geography of the frontier province of the two empires and their probable plans of operation in the event of war.

Geographical description of the Russian frontier of Austria-Hungary.

The frontier of Austria-Hungary towards Russia comprises the provinces of Silesia, Gallicia, and part of the Bukovina, the whole forming a glacis to the great Carpathian range, a mountain rampart protecting Hungary from an attack from the north.

The Carpathian mountains.

The Carpathian mountains commence with the Little Carpathians, near Pressburg on the Danube, which form, with a portion of the main range, a continuous chain running in a north-easterly direction for about one hundred and twenty-five miles, which is the natural boundary between Hungary and Moravia. Due south of Teschen, and the frontier of Prussian Silesia, the mountain range turns eastward, throwing out the subsidiary Beskiden range, a formidable obstacle from a military point of view. Beyond this the main range is continued by the Babia Gora mountains, which form a curve towards the north extending for about thirty miles. The principal range then runs directly south, and after some twenty miles turns abruptly east, forming with a portion of the chain that runs northwards a semi-circle about eighteen miles across. This portion of the range is called the Tatra, and contains the highest peaks in the portion of the range near the frontier, several of them being nearly nine thousand feet above the sea. East of the Tatra a gap in the range occurs, which is traversed by the Poprad and the Novo-Sandek railway. Good roads pass round the east of the Tatra to Javorain on the north, whence passable, well-bridged mountain roads lead to Neumark and Krakau. A limited amount of supplies would be procurable at the various watering places near the Tatra, but the country is, generally speaking, poor with small available resources. North of the Tatra a subsidiary range of the Babia Gora forms the opposite side of the valley of the Dunajec. On the east the mountains are less pronounced. At Jasliska, twenty-five miles east of the Poprad, the main range turns towards the south-east, and runs in that direction till it passes beyond the line of the Russian frontier.

Throughout the Carpathians the northern slopes are much steeper than the southern. The northern slopes of the Tatra are so steep as to be almost precipitous. They are continued to the north by hills, which slope gently into the valley of the Dunajec, beyond which is the lower range of mountains before mentioned. In the western portion of the range the mountains slope gently towards the south forming fertile upland valleys, and are continued by subsidiary ranges which extend as far as the valleys of the Danube and the Theiss.

The Dunajec valley and the gap of the Poprad.

The valley of the Dunajec is traversed by roads leading from Gallicia across the skirts of the Tatra to Eperies and Kaschau in north Hungary. These roads, as well as the railway traversing the gap of the Poprad, are frequently bridged, and constructed on embankments, so that they could be easily destroyed by a retreating army. Beyond the Dunajec valley the country descends into the valley of the Vistula in a series of folds gentler on the northern side.

The watershed in central Gallicia.

In the east centre of Gallicia, the spurs of the Carpathians, jutting out towards Przemyl, form the geographical centre of that part of Europe, as they separate the Vistula, and Dniester systems, which belong to the Baltic and Black Sea basins respectively. Thus, besides the general slope northwards from the Carpathians of the lowlands in Gallicia, and the plains of Volhynia and Podolia, the terrain falls gently towards the north-west on one side and the south-east on the other, following the course of the two great rivers and their tributaries.

The Vistula valley.

The Vistula valley, which is wide and almost level especially east of Krakau, forms the boundary of the mountainous country from opposite the Babia Gora to where the range turns southwards at Jasliska.

The eastern Carpathians.

In the eastern portion of the range the mountains have not the Alpine character of the Tatra, and are continued northwards by a number of subsidiary ranges pierced by the valleys of the Lan, and other large tributaries of the Dniester, which form a most difficult and intersected terrain. On the left bank of the Dniester, there are hills forming the watershed between the Prypet and the Dniester, but they are nowhere of a mountainous character.

The central portion of the range best adapted for military operations.

Generally speaking, the central portion of the Carpathians, facing the line Bochnia-Tarnof-Rzezof, is the best suited for military movements, as the mountains are traversed by two railways, and numerous practicable roads.

Lowland Gallicia.

The Gallician lowlands towards the Russian frontier present the aspect of a thickly populated, fertile country, with highly cultivated plains, and large forests alternating. They are traversed by good roads, and west of Przemysl by two parallel lines of railway from west to east. East of Przemysl there are three cross lines of railway.

Fortresses.

The artificial defences of the Austrian frontier towards Russia consist of the fortresses of Krakau, and Przemysl, and provisional works at Jaroslav, and Lemberg, with barrier forts in the different passes of the Carpathian range.

The Austro-Hungarian frontier of Russia.

The Russian frontier of Austria is composed of a small portion of the province of Pioterkoff, and the provinces of Kielce, Radom, and Lublin, in Poland, and the provinces of Volhynia, and Podolia, and a small part of that of Bessarabia, in south-west Russia. The greater portion of this frontier is defined by no natural boundary, as it is the result of the almost casual partition of the ancient kingdom of Poland during the last century.

The frontier is open from Granitsa, where the frontier of the three great European empires unite, to near Niepolomitse, where the Vistula becomes the boundary, the frontier line running along that river, and approximately along its tributary the San, as far as Kurylovka due south of Lublin, where the real open frontier between Austria and Russia commences. The frontier continues in an east-north-easterly direction to Dzary, where the Bug, which separates Poland from Volhynia, crosses the frontier. From the Bug the frontier runs south-east to Avratin. Thence it runs south through Podvolochiska (where the Vienna-Odessa railway crosses the frontier), following the course of the Podhorce river as far as its junction with the Dniester. South of this the Russian frontier projects into Austria along the course of the Dniester for twenty-five miles, when, turning abruptly back, it runs south-east to Novoselitsa, where the frontiers of Russia, Roumania, and Austria meet.

General character of Poland.

In Poland beyond the Vistula there extends a hilly country as far as Kielce, where the Lysa Gora rise to a height of 1000 feet above the sea. Beyond this the plateau of Poland extends in rich undulating plains interspersed with forests. The soil of central Poland, especially in the Vistula valley, is a heavy black loam, which in wet weather forms the Polish mud so celebrated in Napoleon's disastrous campaign.

Of Volhynia.

No natural feature defines the frontier of Volhynia. Between the Bug and the Styr there extends a thickly wooded country, traversed by fair roads but intersected by the tributaries of the two rivers. The country between the Styr and the Odessa railway at Podvolochiska is open, and undulating, its general glope being away from the Austrian frontier towards the steppes beyond the Dnieper, to which the country bears a great resemblance. It is admirably adapted for the movements of troops on a large scale, especially cavalry. The roads are not very good, but the ground is firm, except close to the rivers, where it is marshy in places. There are many large forests especially south of the Zdolbunovo-Kazatin railway.

The Dniester valley.

The valley of the Dniester and its neighbourhood are unsuited for an Austrian offensive movement, as the tributary streams run parallel to the frontier through steep valleys.

The frontier region generally.

Throughout the frontier territories there are few places in which contests for the possession of villages would take place, as the villages are composed of wooden, or wattle huts, with thatched roofs, and are too inflammable to admit of a stubborn defence. The traveller is impressed by the general monotony of the scenery, an endless succession of open plains (between Lemberg and Kieft chiefly under wheat), varied by hardly a hillock, except at Dubno and Kreminitz, where the hills are insignificant. The only relief to the scenery is the presence of villages and forests, both of which are frequent in the rich Little Russian land.*

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* Those who wish for a more detailed description of the two frontiers than this necessarily brief one will find them fully considered in Marga.

The defences of Poland.

Along the frontier that has been described, Russia has only made elaborate preparations for the defence of Poland. The violation of the clauses of the Vienna treaty relative to that country might have resulted in the interference of the signatory powers, besides which Napoleon had marched through Poland, so it was considered desirable to take measures for its defence. The principal natural obstacle to the occupation of Poland is the Vistula; accordingly, three of the fortresses of the Polish Quadrilateral, namely Novo-Georgievsk, Warsaw, and Ivangorod have been constructed on that river. Beyond the line of the Vistula, commanding the Bug, and protecting an important railway junction, is the fourth fortress Brest-Litofsk.

The defenceless condition of Volhynia.

The Russians have done little for the defence of a frontier so exposed as that of Volhynia There is no region in central Europe, except perhaps parts of Silesia, better adapted for the operations of war than this. A position at Dubno, the fortification of which is far from complete, forms, with the exception of some obsolete fortifications of the Polish days, all the artificial protection given to the country between the Dnieper and the Austrian frontier.

Modern ideas as to frontier defence.

Modern military science recognises two methods for organising the military defence of a frontier, first a comprehensive system of fortification, secondly such a development of railway communications as will insure a more speedy concentration on the menaced frontier than the enemy can possibly effect. The best example of the latter is presented by the German railway defence of the Silesian frontier, where the presence of the iron industries has rendered possible the most elaborate preparations for the detraining of troops. The Russian railway communications in Volhynia and Podolia offer no parallel to this, as the lines touching the Austrian frontier at Brody and Podvolochiska are single, as is that under construction from Djmerinka to Novoselitsa; the last will also have an inferior carrying power. The superiority of the neighbouring Austrian frontier railways may be seen by a glance at the map.

Russian measures for the defence of the open frontier.

The Russians are quite aware of the unsatisfactory military situation of their south-western frontier, and the measures taken to remedy it gave rise to the war scare of 1888. Since then the Grand Commandment of Kieff has been reconstituted, and two army corps (the ixth from Orel and the xvith from the Caucasus) and four cavalry divisions have been added to the peace effective available for the defence of the open frontier.

The defence rendered difficult owing to the presence of the Minsk marshes.

The defence of the Russian south-western frontier as a whole is rendered more difficult by the presence of the vast Minsk marshes on the Prypet, which cut off the communication between Poland and the south-west country. These marshes prevent the concentration of the Russian forces at will on either side of their defensive line, a power almost indispensable to an efficient defence. The Russians have endeavoured to obviate this advantage by the construction of railways running east and west through the frontier territory. These railways can hardly be regarded as fulfilling the required object, as the southern and principal railway from Ivangorod or Brest-Litofsk through Kovel and Kazatin to Kieff or Odessa is in dangerous proximity to the Austrian frontier; and even if the Russians were able to effect a timely concentration of the necessary force for the occupation of the Dubno position to protect the important junctions of Rovno and Zdolbunovo, the open nature of the surrounding country would deprive the position of much of its significance. The recently constructed strategic railway from Brest to Homel has a very small carrying power, and certainly is very far from neutralising the marshes as an obstacle. It has the further disadvantage, that its use would bring troops on to railways that would be required for moving troops from Russia proper for the defence of Kieff.

Similarity of the situation to that at the commencement of the war of 1877.

The foregoing general description of the country, in which the opening stages of a war between Russia and Austria must take place, will serve to show how similar the conditions would be for either power assuming the offensive to those which presented themselves to the Russians after the passage of the Danube in 1877. The resemblance is closest in the case of Russia, as, on crossing the Austrian frontier, dispositions would have to be made for contending with three defensive groups in the neighbourhood of Krakau, Przemysl and Lemberg, respectively, and a subsequent advance on the Carpathians. Similarly, the Austrians, in the event of their invading Russia in the direction of Kieff, would have to guard their right from a hostile movement based on Odessa, and their left from the army of Poland.

The Russian and Austrian armies.

Before considering in detail the possible events at the commencement of hostilities between Russia and Austria, it is necessary to set forth the strength of the forces of the two powers, and the conditions that would affect their concentration on their respective frontiers, to carry out a previously determined strategic plan.

Their distribution and concentration.

The tables in the appendix show the distribution of both armies on mobilisation, the railways which would most likely be made use of for their concentration on the frontier, and the distance to be traversed to gain the station of concentration.

The Russian army.

The present war establishment of the Russians army is about 2,850,000* combatants.

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* According to the "armed strength of Russia" the available troops at the end of 1889 were 2,665,743. In this the Opaltchenie is not included. This force is really only a registration of adult males liable for military service, so its great numerical strength is no index of its military value, In it, however, are included a large number of reservists who have completed their service in the active army and reserve.

Drawbacks attendant on its mobilisation.

A Russian mobilisation is attended by the great disadvantage that, owing to the presence of alien populations in Poland, the Baltic provinces, and elsewhere, it has not been possible to introduce a thorough system of localisation, as eighty per cent. of each corps are raised locally, the remaining twenty per cent. being drawn from the general conscription. Moreover, owing to the exposed nature of her European frontier, and the military preparedness of the neighbouring powers, Russia has been obliged to concentrate an undue proportion of her forces during peace towards the menaced frontier; consequently a mobilisation would require the transport of a large number of the first reserve from the interior to raise the corps on the frontier to the war strength The example of what occurred in France in July 1870, proves that such an operation is incompatible with an efficient concentration. It may be accepted as an axiom in continental warfare that, unless localisation has been thoroughly adopted, it is impossible to carry out a perfectly satisfactory mobilisation and concentration. Russia has endeavoured to obviate this disadvantage by allowing reserve men to join the nearest corps on mobilisation, but as eleven of the twenty army corps maintained during peace are quartered in the frontier provinces, they could not be raised to the war establishment from the local reserves, even if it were politically expedient to embody a large foreign element in the first line. Thus a Russian mobilisation must be attended by a serious delay.

And concentration.

With reference to concentration, although nearly all the Russian army is quartered in the western portion of the empire, the railway system has not been sufficiently developed to neutralise the great disadvantage from which Russia has always suffered in European wars, namely the vast extent of her territory: it even appears enhanced, as the admirably organised German and Austrian railway systems have increased their power for rapid offensive movements, and as troops are only valuable for defensive purposes when available where required, they have rendered the concentration of superior forces against the Russians possible on the outbreak of war.

Russia's advantage over Austria.

Russia has an advantage over Austria in the completeness of her command arrangements and the more thorough organisation of her available forces. The peace establishment of the Russian army includes Commanders of Grand Commandments, who would in war command armies. These officers exercise supreme civil and military powers within their commands, an advantage, the influence of which will not fail to make itself apparent on the outbreak of war. The Grand Commandments of Kieff and Warsaw, which control the European frontier of Russia, are at present held by Generals Gourko and Dragomiroff, officers who enjoy a European reputation. Russia has the further advantage that her peace establishment includes nineteen cavalry divisions and the necessary establishment for forming eighteen reserve divisions of infantry on mobilisation.

The Austrian army. The defects in its system.

At the end of this year the war strength of the Austro-Hungarian army will be 2,671,000. There are two defects in the Austrian military system which would occasion considerable delay in mobilisation. First, the detachment of the xvth army corps to Serajevo to garrison Bosnia, and the Herzegovina; and, secondly, that the military law of 1886 which has added 1,100,000 men to the Austrian effective was accompanied by no comprehensive redistribution of the army. The consequence of this is, that there are an insufficient number of corps and division cadres for the available troops. As a part of this defective organisation, it may be mentioned that, with the exception of the cavalry divisions at Lemberg and Krakau, the brigade is the highest unit in the Austrian cavalry.

The Austrian advantage lies in rapidity of concentration.

The mobilisation and concentration of the Russian and Austrian armies would take place much more slowly than those of the German and French armies. Austria, however, appears to posses a decided advantage over Russia in superior rapidity of concentration.

The appendix considered.

The distances set down in the table given in the appendix are only approximate, they are merely intended to illustrate the great difficulty of concentrating the Russian as compared with the Austrian army. It will be observed that the distances have been taken in Austria's case to the eastern portion of her frontier territory, for which her railway system is least adapted. Notwithstanding this, the average distance to be traversed by the Austrian corps is 438 miles, while that by the Russian is 562 miles. Moreover the most populous districts of Austria are situated in close proximity to Gallicia, so the greater part of the army would have to traverse much shorter distances than the average above laid down.

Russian disadvantages for railway concentration.

The deficiency of rolling-stock, the great distances, and the fact that most of their railways are single lines, would occasion considerable delay in the Russian concentration. Further inconvenience would arise from the facts that the stations are far apart, and that the ordinary traffic on the single lines is limited to one or two trains a day. There would be considerable difficulty in obtaining the extra trained personnel necessary for a large troop traffic, as until very recently Russia has only maintained railway troops, except as cadres, in the trans-Caspian provinces.

In the absence of properly detailed maps, it is impossible to present more than a general idea of the difficulties attendant on moving masses of troops such great distances as the Russians have to traverse, when only four through lines of railway, three of which are single, are available for the purpose.

A comparison of the peace concentration of the two armies, and the consideration that the movement of troops into the frontier provinces to complete the mobilisation of the corps quartered there will interfere with the Russian concentration, justifies the conclusion that Austria by making use of her six lines of railway could concentrate 1,300,000 troops on the Gallician frontier, while Russia was assembling 800,000 in her frontier provinces.

This calculation appears the more moderate, when it is considered that no allowance has been made for the garrisoning of the Baltic provinces, the probable necessity for detaching troops westward for the protection of the East Prussian and Posen frontiers of Poland, nor for the provision of fortress garrisons.

The possible operations on the outbreak of hostilities.

The possible course of events at the commencement of hostilities between Austria and Russia are:—

(1) A Russian invasion of Austria.

(2) A simultaneous effort on the part of both powers to assume the initiative.

(3) An Austrian invasion of Russia.

(1) A Russian invasion of Austria.

Vienna as an objective.

Under the strategic conditions which governed military operations until very recently, Vienna would have been Russia's objective in an offensive campaign. An advance in that direction would appear desirable from the fact that the junction of the Warsaw-Ivanforod and the Warsaw-Skiernevitse lines near the Austrian frontier (the latter of which is the only double line of railway connecting Russia with Austria) will necessitate the concentration in that direction of a large portion of any invading Russian force. Further, Moravia offers the most direct, and practicable route to the ultimate objective, Vienna, traversing the richest country, and following the course of the principal railway connecting Gallicia with Austria.

A passive attitude on Austria's part a necessary preliminary to a Russian invasion of Austria. The difficulty of advancing on Vienna.

In order to suppose a Russian invasion of Austria possible, it is necessary to assume that political or other reasons will induce Austria to forego the initiative, the option of which is conferred on her by the superior concentration of her troops, and the comparative excellence of her railway system. This assumption granted, it is an evident disadvantage to a Russian invader desiring to advance towards Vienna, that the position of Prussian Silesia covers Moravia from a direct advance from Poland, necessitating a movement across the Vistula valley above Krakau, which would entail the exposure of the left flank of an invading force to a possible Austrian concentration at Krakau or any point along the north-western portion of the Carpathians, a concentration for which the Austrian railway system is admirably adapted—while the other flank would be dangerously near the German frontier. The strategical situation would be such, that a tactical reverse would be disastrous. Even granting that the Russians were willing to run the risk of attempting an attack in this direction, the theatre partakes too much of the nature of a strategic defile to admit of the deployment of the force that would be necessary for the invasion of a great modern state.

Natural Russian concentration in two groups.

By making use of all their available railways, the Russian troops would concentrate in two main groups opposite Krakau and Lemberg respectively.

Necessity for carrying the line of the Carpathians.

The occupation of the Carpathians appears to be a necessary preliminary to a modern invasion of Austria from the north. An enveloping attack upon the line of the Carpathians facing the Russian frontier seems the only strategical disposition which will enable Russia to develope sufficient force to overcome the Austrian resistance. The primary requisite for the modern offensive is to be present in superior force at the moment of the first serious collision with the enemy. In this case the fulfilment of this condition is particularly difficult. Large detachments will have to be made to deal with the fortresses, while the maintenance of a superior force to attack the line of the Carpathians will become more difficult the nearer the mountains are approached, as the construction of temporary railways will become more difficult. In fact the Carpathians with the fortresses as outworks confer upon Austria the advantages of a fortress frontier—they require time and superior force to subdue them.

The changed conditions of mountain warfare.

In no respect does the warfare of the future seem likely to be more different from that of the past than in mountain operations. The strategic advantages conferred on the offensive by the power of massing his troops against one point, while detaining the enemy by feints along the whole defensive line, which proved decisive in former wars, appear to be rendered nugatory now by the tactical disadvantages of the situation, when the defenders, by a skilful development of rail and road communications, have rendered the mountains no longer an obstacle to themselves. The retreating defenders would destroy the railroads and roads before the advancing invaders, who could only repair them after considerable delay, owing to the necessity for reconstructing tunnels, bridges, and embankments; while in the absence of railways, it would be impossible to supply a sufficient force to operate successfully against a defender supplied by railways, and possessed of the great tactical advantages attendant on the defence of mountain passes. It seems just, therefore, to assume that, in modern Europe, where forces are too numerous to be independent of railways, mountains greatly enhance the difficulties of the offensive. The occupation of a portion of the Carpathians would not prevent the mountains from influencing the subsequent operations. It would be necessary to take elaborate precautions to ensure the safety of the communications of a force operating in Hungary from attacks based on Krakau, and Lemberg, as the Beskid mountains and the western Carpathians effectually protect the line of communications through Moravia from any attack from a hostile force operating in north Hungary. The influence of the Carpathians would also prevent an occupation of Gallicia, as the screen afforded by them would enable Austria to move troops from one side of the theatre to the other, in a such manner as to render a hostile occupation impossible.

The most favourable Russian plan of operations. The western army.

Apparently the best Russian plan of operations would be for the right group, which would assemble on the Polish frontier, to detach a force to operate in the Vistula valley above Krakau against that fortress and its communications, while the main force crossed the Vistula below Krakau. A further detachment would have to be made against Krakau on this side, and the combined forces detached against the fortress would have to be sufficiently strong to cut off the railway communication between it, and the Carpathians, and Vienna; as otherwise the Austrians could concentrate a strong force dangerously near the communications of the Russian western army. A similar but weaker covering force would have to be detached to mask the western portion of the rayons of Przemysl and Jaroslav. The operations of the western army would be delayed by the necessity of bridging and securing a bridge-head over the Vistula.

The Russian eastern army.

The second or eastern Russian army would assemble in two groups in the neighbourhood of Brody and Podvolochiska. It would be in a position to carry out an enveloping attack on Lemberg. It would have to detach a force to protect its right flank, by operating against Przemysl, and Jaroslav, and another to protect its left from an attack through the Bukovina; the latter would not have to be very strong, as the country is so intersected as to be unsuited for the operations of large forces.

Subsequent operations. General conclusions.

When the fortresses had been masked, the remaining portions of the two Russian armies would advance towards the Carpathians, during which advance or during the operation in the neighbourhood of Krakau a decisive tactical encounter would probably determine the course of the subsequent operations. Whatever happened, the conquest of the line of the Carpathians would be a very tedious operation. No doubt time, perseverance, and superior force, would effect their result in this, as in all previous wars; but if we consider the nature of the theatre, the superiority of the Austrian communications, and the fact that the dual Empire disposes of two and a half millions of soldiers, we must conclude that the task is one that will tax to the utmost the resources of the great northern power.

(2). The case in which both Russia and Austria endeavour to assume the initiative.

Austria's position. Russia subject to invasion from a neighbouring state.

To consider first the Austrian situation. Since the overthrow of the grand army in 1812-13, Russia has enjoyed a reputation for inaccessibility to invasion, which appears to have no solid foundation. Though it may be asked with apparent reason who is likely to succeed, where such a leader as Napoleon failed, an examination of the campaign that proved so disastrous to that great commander will show that the retreat from Moscow was caused by the fact that a hostile Germany intervened between the French army and France; and was rendered disastrous by the absence of a properly organised system of supply. Had Napoleon's real base been in Germany, and had his commissariat been better organised, he could have afforded to canton his troops about Smolensk for the winter, and occupy Moscow in the summer of 1813. Russia appears at present very liable to a successful attack from a power that is so placed, as to be able to retain any territory it may conquer. The provinces which form the European frontier of Russia are inhabited by an alien population. Although Russia endeavoured after the revolt of 1863 to conciliate the Polish peasantry by distributing the confiscated lands among them and thus rendering them the richest of their class in Europe, the moral effect of those concessions has been weakened by the steady, and so far hardly successful, efforts that have been made, to suppress the Polish language and nationality.

Russia and Poland.

The country lying between Gallicia and the Dnieper formed part of Poland till the reign of Peter the Great, during whose minority Princess Sophia obliged Sobieski to cede it as the price of an alliance against the Sultan. It was not, however, regularly incorporated with the Russian empire till much later, as it long remained subject to the almost independent authority of the Hetmans of the Cossacks. The land in those provinces is still for the most part in the possession of Polish proprietors, and the Little Russian peasantry have many grievances of their own. It is reasonable, therefore, to assume that the inhabitants of the border provinces would regard a change of rule with indifference, while they and the numerous Jews infesting the frontier, and controlling most of the local resources, who are covertly hostile to Russia, would certainly gladly sell supplies to an invading army.

The south-western provinces.

[The principal strategic railway centres along the Gallician frontier are :—

Tchebinia, Krakau, Tarnof, Przemysl, and Lemberg.

These points are connected with one another by two distinct lines.

The railways in Gallicia.

Tchebinia is on the direct Warsaw-Vienna line, which crosses the frontier at Granitsa. It is also connected with the German Silesian railway system and the railways in Gallicia.

A branch from the Tarnof-Przemsyl railway at Dembitsa follows the course of the Visloka as far as the Vistula, and thence passes along that river as far as its junction with the San. A railway leaving the Tarnof-Przemysl line at Jaroslav runs parallel to the frontier as far as Ravaruska, where it is joined by a line from Lemberg, thence a branch runs westward to the frontier at Belzec. This line continues its course parallel to the frontier as far as Krystinopol, where it turns in a northwesterly direction and runs to the frontier some seven miles west of the Bug. None of these railways connect with the Russian railway system.

From Lemberg two lines join the Russian railways *viz.*, Lemberg—Krasne—Brody—Dubno—Zdolbunovo, and Lemberg—Krasne Podvolohilieska—Proskurof—Odessa. Two other lines lead from Lemberg to the frontier at Husyatin and Novoselitsa, but they are not met by corresponding Russian lines, though one is being constructed from Djmerinka to Novoselitsa.]

Austian plans of operations.

The Austrian railway system is better adapted for a concentration against the Polish frontier than on that of the south-west country, and the command of both banks of the upper Vistula conferred by the possession of the double bridge-head at Krakau, together with the fact that an attack in this portion of the theatre would anticipate the main Russian concentration for invasion, would recommend an offensive movement in this direction. On examination, it does not appear that an invasion based on Krakau would be attended by the best results. The Russians are prepared for an attack on Poland ; their best railways lead into that province, and their defensive is supported by the line of the Vistula, and the fortresses (which are particularly difficult to deal with, as they are situated astride rivers), an attack on which would gain them the time they lose by their defective communications. Austria's principal weapon is rapidity, as that must compensate for the numerical inferiority of her army. An attack on fortresses would render this inoperative, besides which, it is contrary to common sense to oblige your enemy by attacking him where he is best prepared to resist you, when you can go elsewhere.

The disadvantages attendant on attacking Poland.

The Austrian railway system is well adapted for an invasion based on Przemysl and Jaroslav, directed on the country between the Vistula and the Bug. The selection of this line turns the Vistula, and obtains protection for the flanks of the invading army from the Vistula and the Minsk marshes. The invading force would have to deal with Brest-Litofsk and Ivangorod, while Warsaw would exercise an influence. The railways and the support afforded by the rayons of the fortresses would enable the Russians to check the invaders with inferior forces, and thus gain time for her concentration. Were Austria and Germany acting together against Russia, and had the Germans advanced from East Prussia through Kovno on Vilna and destroyed the railway communication between St. Petersburg and Warsaw, and detached a force to cut off communication between Smolensk and Brest, and operate against the Polish fortresses from the north, an Austrian advance between the Vistula and the Bug would be attended by the best results ; but, even then, it would not be the best line for the advance of the main body of an invading army.

A favourable opportunity for invasion presented by the defenceless state of the Russian south-western provinces.

An attack in the direction of Kieff, combined with a movement against the Polish frontier, appears the action for which the geographical features of the theatre are best adapted, as there are no formidable natural, or artificial, obstacles barring the advance. An invasion on the east would be favourable to the Austrians, as it would afford them excellent ground for the use of their cavalry, who would be at a disadvantage in contending with mounted infantry in the intersected country between the Vistula and the Lysa Gora. Volhynia and Podolia present the further advantage that the terrain is better adapted than that of Poland for the supply of a large invading force. There would be considerable difficulty in making temporary railways through the hilly country north of Krakau, while the undulating plains of Volhynia and Podolia present no obstacle to the construction of temporary lines, and the Russian railway Lublin—Kovel—Rovno—Zdolbunovo—Kazatin runs in a direction generally parallel to the Austrian frontier railways, with which they could be easily connected. Austria is perhaps better qualified to make use of this advantage than any other power, as she has devoted especial attention to the training of her railway pioneer troops, and the military organisation of the establishments of her principal railways places at her disposal a numerous trained personnel for the service of the railways to be constructed in rear of the advancing troops. The difference of gauge on the Russian railways would occasion no serious delays, as most of the Austrian railway stock has been fitted with shifting axles, and in nearly every case the lines would have to be relayed, which, considering the rough character of the lines required for military purposes, could be effected very rapidly,

Austria's best apparent action.

A movement on Rovno, with the detachment of a force to Kovel, to seize the important railway junction there, and protect the left flank of the invading army, could take place before the Russian preparations were sufficiently complete to enable them to act in force against the flanks of the Austrian advance. Moreover, the uncertainty as to the strength of the portion of the Austrian forces operating against the Polish frontier would prevent the Russians from withdrawing many troops from their western army until the Austrian attack had clearly developed. During the subsequent operations the Minsk marshes would exercise their full influence in separating the Russian forces. It would be necessary for the Austrians to make a further detachment, to oppose a movement against their right flank based on Odessa. Assuming that Austria would not undertake an invasion before she had concentrated 1,300,000 troops for the purpose, the detachment of 200,000 to cover each flank, and 300,000 to operate against the Polish frontier, the remaining 600,000 would be sufficient to contend with any force the Russians could concentrate to oppose them on the right bank of the Dnieper.*

The plan of operations considered above is attended by the disadvantage that western Gallicia would be liable to an invasion from the Russian western army, which would concentrate on the Polish frontier. It does not appear possible to devise a plan of invasion that is not attended by serious drawbacks. It would be impossible for Austria to commit herself to an attack on both Poland and the south-western Russian provinces, as it would be more difficult to develope the superior numbers required for a tactical success, and by doing so she would be as unfavourably affected by the Minsk marshes as the Russians. Western Gallicia is in every way better adapted for the operations of a containing force than the other side of the theatre, as their railways and the bridgehead over the Vistula at Krakau would enable the Austrians to render the passage of the river and the security of the Russian communications beyond it very difficult, while, supposing the river crossed, the nature of the theatre would enable the subsequent advance to be opposed by inferior forces. The fact that the main Austrian concentration would take place further east would enable the Austrian reserve troops to be concentrated on the Polish frontier in time to oppose the Russian advance. A Russian attack on Western Gallicia could only take place with the full consent of Germany, as the position of Posen, and German Silesia, threatens the flank of an invading Russian force. The influence of the Austrian attack on the east would make itself felt before the Russians could force the passage of the Vistula, and possibly prevent serious operations in the Polish portion of the theatre. An attack in the direction of Kieff would be popular in Austria-Hungary, as by its very nature it would menace the communication between Russia and the Balkan States, for the protection of her interests in which Austria would be most likely to appeal to arms. Though from a military point of view this is immaterial, as Austria's strategic position in south-eastern Europe is too strong to admit of Russian operations in the Balkan peninsula without her consent, public opinion would doubtless prefer a plan of operations which directly prevented a Russian advance against them.

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* This is rendered the more certain by the defective Russian railway communications in that portion of the theatre.

The influence that will be exercised by the Russian cavalry divisions.

There is a disturbing influence to be anticipated to the Austrian concentration, the precise extent of which cannot easily be estimated beforehand. The Russians have prepared a strong cavalry force to act with supporting infantry in disturbing the Austrian mobilisation and concentration in Gallicia, and thus neutralise their superior communications. A raid of this nature will no doubt cause the Austrian concentration to take place further from the frontier than it would under other circumstances, but it is not to be expected that the Russian cavalry and supporting rifle brigades, who can expect no sympathy from the Poles, will succeed, in the face of the opposition of the two corps and cavalry divisions at present in Gallicia, supported by the second line troops and landsturm of that thickly populated province, in reaching that portion of the theatre in which, owing to the proximity of the mountains, railways once destroyed would be difficult to reconstruct. The constant arrival of fresh troops would force back the raiders, who would not be sufficiently numerous to hope for a great tactical success.

Danger attendant on a Russian concentration too near Gallicia.

The Russian concentration would take place as near the frontier as possible in the two main groups determined by the railway system. All available troops from the armies of Poland and Kieff would assist the cavalry in pushing back the Austrian concentration, and enabling the Russians to secure the communication between the two main groups south of the Minsk marshes. Should Russia take this attitude, her advanced troops will eventually have to contend with very superior Austrian forces. Inconclusive as the lessons of the Franco-German war have been said to be for modern warfare generally, on one point they afford us ample guidance, namely, on the probable result of encounters of inferior forces with assailants greatly outnumbering them. The tendency to outflank, and, if possible, surround an enemy, so conspicuous in modern infantry tactics renders an inferior force liable not merely to defeat but destruction. Macmahon's army at Worth was only saved from annihilation or capture by a flight so precipitate, that it lost its organisation, and by the nearness of the Vosges mountains, which delayed the pursuit. The 80,000 French hemmed in at Sedan were as completely lost to France for the rest of the war as though they had fallen in the battle. This experience of the danger of contending against very superior forces is not refuted by Plevna. The rapidity of modern operations would seldom admit of so elaborate an entrenchment of a position. Plevna belongs to fortress and not to position warfare. Moreover, the value of Plevna for our guidance loses much from the inferiority of the Russian artillery. While there can be little doubt as to the value of entrenched positions in the neighbourhood of fortresses, where the fortress guns can support the defensive in the artillery duel, it is questionable whether in field warfare the offensive artillery, after silencing the opposing guns, could not render a successful infantry assault possible by its support. In any case it would be easy to surround and starve out such a position. In a country in which there are so few defiles or important positions that cannot be turned as western Russia, the opposition of inferior forces to an invader would be attended by disaster. It is therefore reasonable to conclude that Russia would consult her best interests by not endeavouring to assume the initiative.

(3) An Austrian invasion of Russia.

The best apparent measures the Russians can take against an Austrian invasion.

Austria's plans of operation for an invasion of Russia have already been considered. Should the Russians, fearing that the dispersion of their troops would lead to their defeat, and taking advantage of the fact that the occupation of the alien frontier provinces would rather exasperate than crush the resistance of the real Russian population, determine merely to garrison the fortresses in Poland and hold the bridge-head over the Dnieper at Kieff, while they concentrated their full effective on the line of the Dvina to Smolensk and thence towards Orel, it would give them the most favourable chance of prosecuting the subsequent operations of the campaign with success. The cross railways at their disposal, together with the double lines of railway from Petersburg and Moscow debouching on the flanks of the defensive line, would enable the Russians to prepare for an offensive movement against either Poland or the south-western provinces. The necessity for this action would be still more urgent in the case of a combined Austrian and German invasion. The Minsk marshes would then be favourable to the Russians, as they would divide the front of the invaders then obliged to act on the defensive, and a great tactical success might render a subsequent invasion of Gallicia and an attack on the Carpathians possible, which it can at present hardly be deemed to be.

General conclusions.

The conditions affecting the assumption of the initiative in the various cases that have been considered prove that, the more highly a nation's preparations for war have been elaborated during peace, and the more carefully detailed plans of operation have been worked out, the more difficult it will be for an adversary to gain an advantage over it in the opening stages of a war. If, on the other hand, a nation has not been able to develope its communications, and so cannot organise a sufficiently rapid concentration, it must lose the initiative, which is more important now than in former wars, owing to the increased influence of the strategical design on the issue of a modern campaign.

The influence of civilisation on the warlike qualities of a nation.

It is interesting to consider the influence of civilisation on the military qualifications of a nation. Some German authorities regard Russia as chiefly formidable owing to the small effect that would be produced on her population by military reverses. Sir Charles Dilke considers that, owing to her population, and resources, Russia could send forth army after army, and thus by stress of numbers alone overcome the forces of any single European state.

There can be no doubt but that the more highly civilised a nation is, the more acutely it feels the sacrifices entailed by war. Supplements to newspapers containing lists of twenty or thirty thousand killed and wounded are not pleasant reading,* nor does the description of what occurred in some of the villages in Posen in 1870, in which all the male population except old men and boys had fallen in battle, present war in its most favourable aspect. These influences will certainly tend towards the preservation of peace, but when war becomes imperatively necessary, there seems no reason to believe that patriotism will grudge the sacrifices required for the maintenance of national honour. Should it be so, little regret need be felt for the loss of a civilisation that renders a people too unmanly to defend its rights.

Disadvantages of backward civilisation from a military point of view.

The callousness to loss attendant on a backward civilisation appears to be the solitary counterpoise to a host of disadvantages. Soldiers who have had no general education are unable to retain the lessons they have learned during their military service after they have spent a short time in the reserve. Though it is true that Russia could put army after army into the field, the fighting quality of every subsequent one would be very inferior to that of the first, and judging from the fate of Gambetta's *levée en masse* in 1870, Russian reserve armies could not be expected to retrieve a war in the event of the defeat of its first army.

Conclusion that Russia suffers from her want of civilisation.

It appears impossible to avoid the conclusion that Russia is at a disadvantage in the opening stages of a European war, in consequence of her vast territory and defective communications. Increasing population, an advance in civilisation, and the expansion of her railway system, will no doubt in time obviate these drawbacks, as Russia is the only European power that has room for a further great development of population within her own borders.

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* Note.—During the battles round Metz in August 1870, the Germans lost 35,000 killed and wounded.

Meanwhile she has the advantage that, by using her frontier provinces as a buffer to gain time for her tardy concentration, her offensive power would not be seriously weakened, while the fact that those provinces are inhabited by aliens would minimise the political consequences of the sacrifice of territory. Russia's real strength lies in Great Russia, and the question is, whether her enormous population, and the resources of a territory so vast as to appear a continent, in comparison with other European states, will enable her to recover her lost provinces in spite of the drawbacks entailed on her by her backward civilisation. This is a question that war alone can decide, and it will be determined by the issue of no single campaign, as the resistance of a nation in arms can only be overcome by a succession of defeats. When a war does break out between Russia and Austria, the national character of the contest will prevent its being a struggle between the Hapsburgs and Romanoffs to decide the escutcheon on the double-eagle for one of the provinces of the ancient kingdom of Poland. It will rather be a war, the issue of which shall determine whether the Latin Civilisation supported by the representative of the Holy Roman Empire of old, or that other civilisation, which is the outcome of the Greek Christianity of the Byzantine Empire of the East, is to be paramount in south-eastern Europe. It is indeed a strange turn of fortune's wheel that has rendered the heir of Charles V. and Philip the champion of European freedom of thought!

The prevalence of an unduly low estimate of the military power of Austria.

The frequent defeats sustained by Austria, and the changed position of the great Hapsburg family, which has lost by successive reverses the hegemony of Germany, and the crowns of Spain and the Indies, Italy, and the Netherlands, have perhaps unduly lowered the military prestige of the dual Empire. The public opinion of Europe is not always a trustworthy guide as to the military power of nations. It was confidently anticipated in 1866 that Austria would defeat Prussia, and in 1870 that France would defeat Germany. Austria enjoys a great advantage over Russia in the superiority of her corps of officers. Whatever tactical formations may be adapted, the issue of battle must depend on the influence of the officers, who are the regular soldiers serving in the midst of men who are citizens first and soldiers afterwards. The Officer has an importance in modern war he has not enjoyed since the middle ages. The higher the caste of the officers, the more they will enjoy the confidence of their men, and the more they will endeavour to deserve it. *Le bon sang ne peut mentir.* A class of gentlemen to furnish officers to their armies is the legacy that chivalry has bequeathed to the nations of the West. It is the result of a state of society, in which the knight had his position as assured and his rights in his own sphere as clearly recognised as the sovereign himself. Russia, a country that hardly two centuries ago was dragged from a semi-Asiatic barbarism into a semi-European civilisation by the iron will of a great autocrat, has no such class in her society. A century has not elapsed since the Emperor Paul said—"There is no man noble in Russia except when I am speaking to him, and then he is only noble while I am speaking to him." It is hardly a matter for surprise that the Russian nobility and gentry are not sufficiently numerous to supply officers, except for the Guard and the best cavalry regiments. The line regiments are usually officered from cadet schools maintained at the government expense. The technical education imparted at a Russian cadet school appears a sorry substitute for centuries of breeding and civilisation. Russia's weakess is the inferiority of her line officers, as the dullness and apathy of her soldiers and the ignorance of her reservists enhance the importance of good leading for her troops.

Conclusion.

An exaggerated estimate appears to prevail as to the influence of divided nationality, and political differences, on the military situation of Austria-Hungary. Political differences disappear in the army, and war will rather unite than divide the conflicting elements, as the subjects of Austria are the most loyal in Europe; and Teuton, Magyar, and Slav, will fight bravely for their beloved Emperor and King, and the Hapsburg dynasty, as they have in so many disastrous wars, whether they serve under the black and gold banner of the House of Austria, or the tricolor of the Apostolic Sovereigns of Hungary.

APPENDIX.

Table showing the stations of the corps of the Austro-Hungarian army and the distances to be traversed for a concentration in Gallicia.

1st Army Corps.	Head-Quarters Krakau	To protect the Krakau Przemysl railway.
2nd Army Corps.	Head-Quarters Vienna	Viâ Ungarisch, Hradisch, Saybusch, Novo Sandec, Przemysl on Jaroslav, 410 miles.
3rd Army Corps.	Head-Quarters Gratz	Viâ Vienna, Krakau, Rzezof on Jaroslav, 480 miles.
4th Army Corps.	Head-Quarter Buda-Pesth	Viâ Debrecin, Munkacs, Beskid, Lemberg on Rawa Ruska, 385 miles.
5th Army Corps.	Head-Quarters Pressburg	Viâ Sillein, Saybusch, New Sandec, on Przemysl, 355 miles.
6th Army Corps.	Head-Quarters Kaschan	Viâ New Sandec to Tarnof to cover the Krakau, Lemberg railway, 126 miles.
7th Army Corps.	Head-Quarters Temesvar	Viâ Grosswardein, Legenye, Mihaly, and Sanok on Jaroslav, 420 miles.
8th Army Corps.	Head-Quarters Prague	Viâ Olmutz, Prerau, Krakau on Jaroslav, 405 miles.
9th Army Corps.	Head-Quarters Josephstadt	To Tchebinia to cover the concentration, 218 miles.
10th Army Corps.	Head-Quarters, Brunn	Viâ Prerau, Skavina, Krakau, Jaroslav to Rawa Ruska, 345 miles.
11th Army Corps.	Head-Quarters Lemberg	To protect the railways.
12th Army Corps.	Head-Quarters Hermannstadt	Viâ Klausenburg, Grosswardein, Szatmar, Nemeti, Munkacs on Lemberg, 465 miles.
13th Army Corps.	Head-Quarters Agram	Viâ Pesth, Miskolic, Kaschau, Novo-Sandek, Tarnoff, Jaroslav, 533 miles.
14th Army Corps.	Head-Quarters Innspruck	Viâ Salzburg, Linz, Vienna on Tchebinia, 505 miles.

15th Army Corps.	
Head-Quarters Serajevo	Viâ Theresiopol, Pesth, Miskolic, Sanok, Stryj, Lemberg, 755 miles.
The Zara Division	By sea to Fiume, 95 miles, thence viâ Agram, Pesth, and Tarnoff on Jaroslav, 635 miles.

Table to show the distances to be traversed by the Russian corps on concentration.

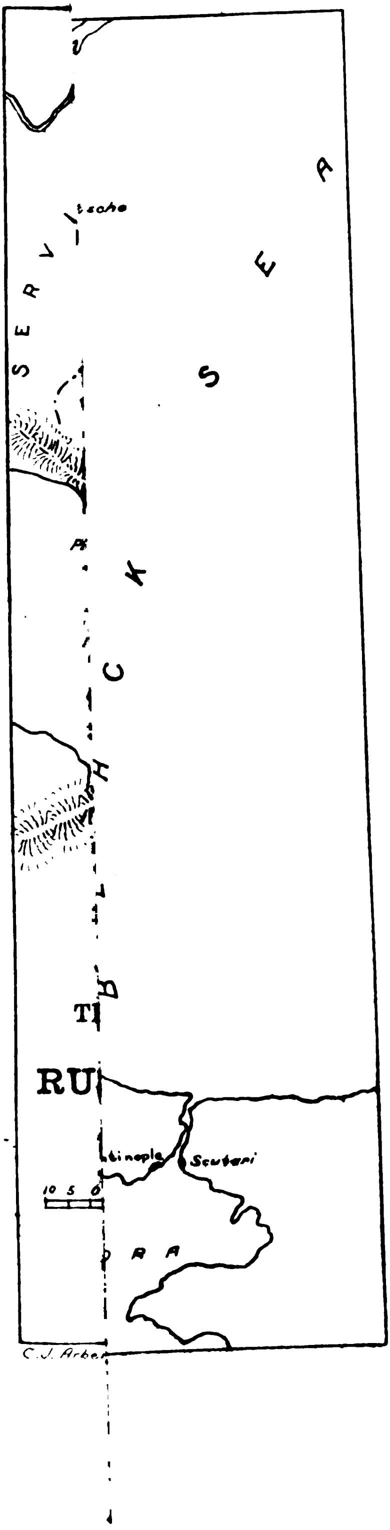
Guard Corps.	*Western Army.*
Head-Quarters St. Petersburg	Viâ Warsaw on Granitsa, 891 miles.
Grenadier Corps.	*Western Army.*
Head-Quarters Moscow	Viâ Brest, Litofsk, and Warsaw on Granitsa, 873 miles.
1st Army Corps.	*Western Army.*
Head-Quarters St. Petersburg	Viâ Warsaw on Granitsa, 891 miles.
2nd Army Corps.	*Western Army.*
Head-Quarters Vilna	Viâ Baranovice, Brest, and Ivangorod to Kielce, 500 miles. Kielce 78 miles by road from Krakau.
3rd Army Corps.	*Western Army.*
Head-Quarters Riga	Viâ Dunaburg and Warsaw on Granitsa, 694 miles.
4th Army Corps.	*Western Army.*
Head-Quarters Minsk	Viâ Brest, Litofsk, and Warsaw on Granitsa, 405 miles.
5th Army Corps.	*Western Army.*
Head-Quarters Warsaw	Viâ Ivangorod on Kielce, 139 miles.
6th Army Corps.	*Western Army.*
Head-Quarters Warsaw	By rail to Granitsa, 191 miles.
7th Army Corps.	*Eastern Army.*
Head-Quarters Sevastopol	By sea to Odessa (265 miles), thence viâ Birzula on Proskurof, 275 miles.
8th Army Corps.	*Eastern Army.*
Head-Quarters Odessa	Viâ Birzula on Proskurof, 275 miles.
9th Corps.	*Eastern Army.*
Head-Quarters-Kieff	From Tchernigof to Dubno about 420 miles.
5th Division.	
33rd Division.	From Kieff via Kazatin on Rovno, 279 miles.
10th Army Corps.	*Eastern Army.*
Head-Qarters Kharkaf	Viâ Elizavetgrad and Birzula to Proskurof, 592 miles.
11th Army Corps.	*Eastern Army.*
Head-Quarters Djitomir	By road to Rovno, 113 miles.
12th Army Corps.	*Eastern Army.*
Head-Quarters Kieff	To cover the concentration.

13th Army Corps.	*Western Army.*
Head-Quarters Moscow	Viâ Smolensk and Warsaw on Granitsa, 873 miles.
14th Army Corps.	Connecting the two armies.
Head-Quarters Lublin	To march towards the frontier.
15th Army Corps.	*Eastern Army.*
Head-Quarters Warsaw	Viâ Brest on Rovno, 259 miles.
16th Army Corps.	*Eastern Army.*
Head-Quarters Vitebsk	
25th Division.	From Dunaburg via Vilna and Baranovice on Rovno, 387 miles.
41st Division.	From Mohilef march to Bobruisk (70 miles), thence by rail viâ Minsk and Baranovice on Rovno, 293 miles.
17th Army Corps.	*Western Army.*
Head-Quarters Nijni-Novgorod.	Viâ Moscow on Granitsa, 1146 miles.
Caucasian Army Corps.	
Head-Quarters Tiflis	Would not be available for the opening operations of a European campaign.
Unattached troops.	*Western Army.*
24th Infantry Division	From Helsingfors by rail to Petersburg thence by rail on Granitsa, 1166 miles.
40th Infantry Division	*Eastern Army.*
	From Saratof viâ Kozlef, Orel, Kursk, Kieff on Kazatin, 937 ms.
20th Infantry Division 21st Infantry Division	In the Caucasus would not be available for the earlier operations.

CAVALRY.

1st Guard Cavalry Division 2nd " " "	From St. Petersburg towards Granitsa by rail, 891 miles.
1st Cavalry Division	From Moscow viâ Brest and Ivangorod on Kielce about 830 miles.
2nd Cavalry Division	From Vilna viâ Baranovice, Brest and Ivangorod on Kielce, 500 miles.
3rd Cavalry Division	From Kovno viâ Vilna, Bielostok and Warsaw on Granitsa, 384 miles.
4th Cavalry Division	From Bielostok viâ Brest and Ivangorod on Kielce, about 250 miles.
5th Cavalry Division	From Vlotlavsk viâ Skiernevice on Granitsa, 231 miles.
6th Cavalry Division	From Warsaw on Granitsa, 191 miles.
7th Cavalry Division	From Elisavetgrad viâ Birzula on Proskurof 187 miles.
8th Cavalry Divisson	From Kischineff to march on Kamienits Podolsk, about 150 miles.

9th Cavalry Division	From Romny viâ Bakhmach and Kieff on Zdolbunovo, 305 miles.
10th Cavalry Division	From Kharkof viâ Elizavetgrad and Birzula to Proskurof, 592 miles.
11th Cavalry Division	From Dubno towards the frontier.
12th Cavalry Division	From Vinnitsa towards the frontier.
13th Cavalry Division	From Lublin towards Belzec.
14th Cavalry Division	From Kielce on Budsicka.
Don Cossack Cavalry Division	From Zamostye on the frontier.
1st Combined Cossack Division	From Kharkof viâ Elizavetgrad and Birzula to Proskurof, 592 miles.
2nd Combined Cossack Division	From Kamienits Podolsk across the frontier.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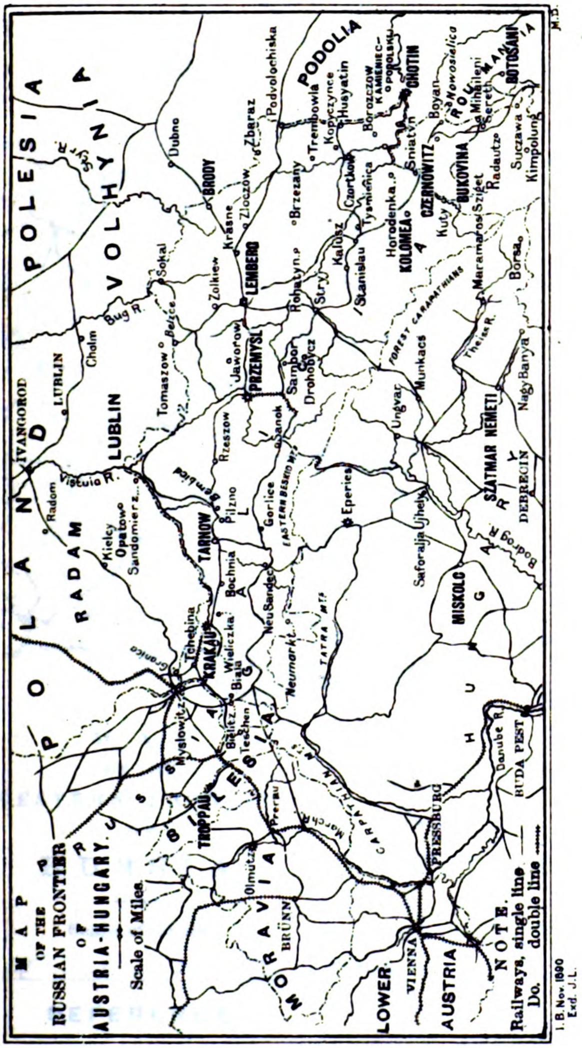
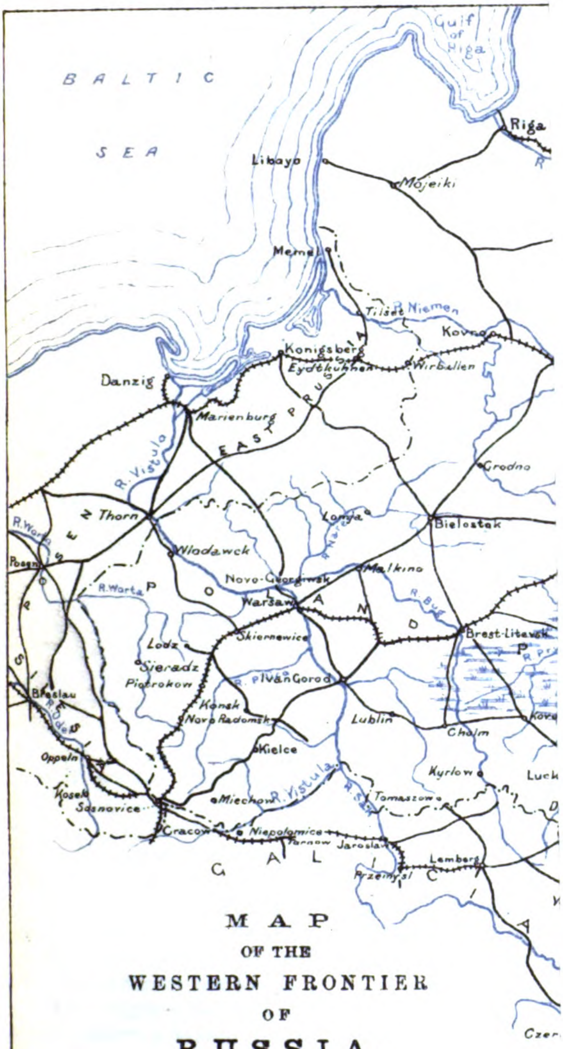
UNIV. OF CAL.


MAP OF THE RUSSIAN FRONTIER OF AUSTRIA-HUNGARY.
Scale of Miles.
NOTE.
Railways, single line
Do. double line
I.B. Nov. 1890
Exd. J.L.
M.D.
POLAND
POLESIA
VOLHYNIA
PODOLIA
RADAM
LUBLIN
GALICIA
SILESIA
MORAVIA
LOWER AUSTRIA
HUNGARY
BUKOVINA
ROUMANIA
Ivangorod
Lublin
Chołm
Bug R.
Vistula R.
Radom
Kielcy
Opatow
Sandomierz
Tomaszow
Belzce
Sokal
Dubno
Brody
Zloczow
Zbaraz
Podvolochiska
Krasne
Zolkiew
Lemberg
Jaworow
Przemysl
Rzeszow
Tarnow
Pilzno
Bochnia
Wieliczka
Krakau
Tchebina
Myslowitz
Bielitz
Biala
Teschen
Troppau
Olmutz
Prerau
Brünn
Vienna
Pressburg
Buda Pest
Danube R.
March R.
Neu Sandec
Neumarkt
Gorlice
Sanok
Sambor
Drohobycz
Stry
Rohatyn
Brzezany
Trembowla
Kopyczynce
Husyatin
Czortkow
Borszczow
Kamieniec-Podolski
Chotin
Kalusz
Stanislau
Tysmienica
Horodenka
Kolomea
Sniatyn
Czernowitz
Kuty
Boyan
Nowosielica
Mihaileni
Sereth
Botosani
Radautz
Suczawa
Kimpolung
Szigeth
Maramaros
Borsa
Forest Carpathians
Munkacs
Theiss R.
Nagy Banya
Ungvar
Szatmar Nemeti
Debrecin
Eperies
Saforalja Ujhely
Bodrog R.
Miskolc
Eastern Beskid Mts.
Tatra Mts.
Carpathian Mts.
Granica
Bembach
Bug R.



MAP
OF THE
WESTERN FRONTIER
OF
RUSSIA.

Scale of Miles.

Miles 50 0 50 100 150 200 Miles

REFERENCE.

Railways, double line, shown thus . . ++++++++++

Do. single line. . . . . ————

C. J. Arbery del:

THE RESURRECTION OF THE LANCE.

> "La lance est la regne des armes."
> MARMONT.

By Capt. G. J. Younghusband, Queen's Own Corps of Guides.

When the foremost military nation in the world decides emphatically in favour of the lance as the most suitable arm for modern cavalry, it behoves other nations to examine the causes which have led to this resurrection of the old and time honoured queen of weapons, and, having so examined them, to regulate their own armament in accordance with the logical finding which that enquiry teaches them.

It goes without saying, that the best weapon to place in the hands of the cavalry soldier is an arm which he knows best how to use in battle, and which accords best with the national characteristics and temperament of him who wields it. His most indulgent friend can hardly say that the ordinary German or French cuirassier is a "born lancer", and therefore the discovery of a very strong inherent superiority in the weapon itself must be considered answerable for the recent rearmament of such a large portion of the cavalry in Europe.

To trace the history of the lance, from its birth amongst the wild eastern hordes who invaded France centuries ago, up to the present year of grace, is to follow her through a very chequered career. At one moment we find her raised high above all arms, the sovereign weapon, which only knights of fame and lofty lineage are entitled to carry in the war. At another she has fallen from her eminence, and, shorn of gay pennant and shortened by a yard, we find her in the hands of the hireling pikeman instead of in that of his mounted lord. Her popularity ebbs and flows generation after generation and century after century, but however low she may fall, "*resurgam*" is her motto, and again and again she raises her proud head, and for a period, sometimes brief, sometimes long, she resumes her sway.

Her origin is somewhat plebeian: she did not burst upon the world in her present graceful queenly form; on the contrary her first ancestor was a common javelin four or five feet long, used either as a missile or as a lethal weapon; much as the Zulus and Arabs use their spears nowa days: to be kept in hand as a rule, but to be thrown when occasion required it. When cavalry began to be used in battle, this short spear was by degrees lengthened and increased in size, till it became the weapon which was used by the knights of the mediæval era, and with which pictures of that period have made us familiar. As the size and weight of the lance increased, the thickness and consequently the weight of the armour worn by horse and man to resist it, increased in proportion, till it came to this pass, that horses of such size and strength were required to carry the burden, that only men of wealth could afford the luxury. In days when might was right, and wealth went to the strongest, wealthiest men were naturally the strongest, and so it came about that only knights and persons of knightly lineage carried the lance, till by degrees it became the badge and synonym of their rank. As long as wealth remained with the knights, the lance was their weapon, but when years of exhausting and impoverishing wars had well nigh ruined the nobility, they could no longer afford to buy and keep up the costly stud of giant horses required to mount them in all their knightly paraphernalia, so that with their wealth died also the lance; for poverty and the queen of weapons could not live together. This was in the reign of Henri IV of France. Towards the end of the 16th century, for nearly two hundred years the lance almost disappeared from the regular armies of Europe, until the genius of the great Napoleon, a constant and careful reader of the history of the past, again brought before a dazzled world the old knightly weapon shortened and lightened, and improved into its present shape. History and experience taught him, that the only way for cavalry to oppose the lance was with the lance, and therefore we read that, when Napoleon found that his best cavalry armed with the sword was unable to face the lances of the enemy, "il sentit le besoin d' opposer les lances français aux lances des hulans et des cosaques." Up to the battle of Waterloo there were no lancer regiments in the British army; it was the lances of our enemies in the retreat from Quatre Bras to Waterloo which taught us the value of the weapon, and lancer regiments were for the first time introduced into our army. During the long period of peace which succeeded the Waterloo campaign, theorists again held their sway, and the lance declined in favour till it was entirely abolished in the French army, and reduced to a minimum in others. The Prussians alone have steadily cultivated and fostered the growth of the lance during the last thirty years; and from Sadowa onwards there has been a slowly but surely increasing conviction amongst the military scientists of Germany, that the lance is the best weapon for cavalry, with the result that to-day we find it the most prominent arm in the German cavalry. Far be it from me to join with those who think that a special Providence directs the working of the German army, and that all things and all nations German are heaven-born and therefore infallible. I am merely in the interests of the lance pointing to the fact, that the consensus of opinion in an army whose numbers run into millions, has, after twenty-five to thirty years of deliberation, decided in favour of the old queen. Whether the decision is considered wise or not for a short service army is quite another question.

Such, briefly, is the history of the lance in Europe up to the present day. In India its rise and fall, only to rise again, has been, during our occupation, much on the same lines. During long periods of peace the lance's friends are gradually but apparently convincingly argued off the field, but when the day of battle comes and sword has to meet lance, the superiority of the latter forces itself on our notice. We conquer India with the sword, but having done so, we arm ourselves with the lance of our enemies. A widespread and terrible mutiny has to be suppressed, irregular cavalry are hastily raised and equipped, and most men use the weapon of their fancy. What is it? In nine cases out of ten the lance: and even amongst the British officers, there are few who have not a hog spear handy when the fight begins. A cavalry regiment is ordered to the Soudan, and at a moment's notice is armed with the lance in preference to its own weapon. Slowly but surely in India, as in Europe, the lance is carrying the day, and it is to aid it however feebly in its path that this paper is written.

Let us take quite dispassionately both sides of the question, and, having done so, apply our summing up to the case in point. One of the most determined opponents of the lance who has written on the subject in latter days is Captain L. E. Nolan, 15th Hussars. This book, "Cavalry its History and Tactics," most valuable though it is, was published in 1853, and does not therefore embrace the experiences gained in wars which have taken place since that date, that is from the Crimea downwards. To give his own words, his impeachment of the lance is based on the following propositions.

(1). " * * A lance is useless in a mêlée: the moment the lancer pulls up, and the impulsive power is stopped, that instant the power of the weapon is gone * * * ."

(2). " * * The lance is not a dangerous weapon in *all* hands, and therefore unfit for soldiers * * * ."

(3). " * * * Let us allow, for the sake of argument, that a lance of a proper length, handy, well poised, and held at its centre, reaches further beyond the horse's head than the point of a sword held at arm's length: in what way can this conduce to success, when it is universally acknowledged that it is the superior impetus and speed of one of the advancing lines which overthrows the other, the weapons only coming into play afterwards? * * * ."

Captain Nolan has certainly got the pick of the objections to the lance. The other objections are of a minor nature, and in disposing of the above, we shall incidentally dispose of them too.

Taking Captain Nolan's second objection as our text, an answer to the other objections will be gradually worked out. "The lance is not a dangerous weapon in *all* hands and therefore unfit for soldiers." This remark sounds the same key note as is touched upon in our reference to the German cavalry. The best arm for a soldier is the arm he can use best, which inspires him with the greatest confidence, and which morally and physically aids him best in defeating his enemy. To put a lance into the hand of this man or that, Englishman, German, or Frenchman, and to say "now you are a lancer," is not all that is required to make a lancer. The soldier must feel himself that he is wielding a familiar weapon, and one which he prefers to any other. National proclivities, long training, activity, horsemanship, are all necessary adjuncts to proficiency with the lance, and therefore Captain Nolan's argument is a very strong one, more especially when applied to the short service armies of Europe, where it takes a soldier all his time to learn to ride fairly well, and to know his drill, without expecting him to become a proficient with such a difficult arm as the lance. But continental armies, in spite of this great drawback, have decided in favour of the lance. "Successful practice must override antagonistic theory;" and practice has apparently taught them that a soldier, even though a short service soldier, is better armed with a lance than without one. This being so, the argument rebounds with redoubled vigour on our own Indian cavalry. There is the exact material which the most enthusiastic votary of the lance could wish for. Long service soldiers, fine horsemen, mounted on wiry active horses, whose national weapon, if any, is the lance, and whose whole bearing and characteristics savour of that dash and *élan* which is the heaven-born lancer's rôle. Because the lance is not a dangerous weapon in *all* hands, German, English, and French, it seems certainly a somewhat drastic ruling, that it is therefore unfit for all soldiers, be they Cossacks, Poles, or Punjabis.

It has always been a strong point against the lance, that, in the mêlée which results from most cavalry charges, the lancer, being possibly brought to a standstill, can no longer use his lance with effect: to be effective he must be moving at speed. But every lancer is armed with a sword as well, furnished him for that very purpose, to finish the work that the lance has begun. This argument gives the opponent to the lance another opening,—"What is the good of a lance, if, directly you get into a fight, you have to throw it away? Surely it is an argument against it that, directly you are in difficulties, you have to fall back on the sword." To show the shallowness of this reasoning, we have only to put one or two simple questions of the same nature.

"What is the good of a carbine, for you don't use it in a mêlée?" "What is the good of carrying 40 rounds of ammunition, when no authenticated instance of any regiment having used an average even of 10 rounds is recorded?" "What is the good of a sword, when we know that only two per thousand of the German wounded were wounded by the sword?" and so on. What we want to do is to arm the cavalry soldier with a set of arms (since a single arm is not sufficient in modern war), which will make him most formidable at all times and under every situation. If the lance is the best weapon for charging at speed, and in pursuit, by all means give the man a lance: if a sword is the best weapon in the mêlée, give him a sword too: if a weapon is required which will strike where sword and lance cannot, give him a carbine. The three are such entirely distinct and separate weapons for distinct and separate uses, that I think we waste time and lose sight of the main point in view, if we wander off into endless arguments as to whether the lance or the sword is the better weapon. My proposition is, that both are excellent weapons, and that it is as bootless to compare the lance with the sword, as it would be to compare the sword with the carbine.

The lance is to cavalry what the bayonet is to infantry. To return for a moment to the third point raised by Captain Nolan, that "it is the superior impetus and speed of one of the advancing lines which overthrows the other, the weapons only coming into play afterwards." Very possibly so, but the line of argument taken infers that the lancer is always the one who is going slowest, and therefore not only is he knocked out of time by the speed and impetus of the opposing swordsmen, but in the mêlée that follows he is defenceless. The inference too is, that two bodies of cavalry hit each other in charging like two brick walls on wheels, and that the brick wall that goes fastest knocks the other over. All the effects of ground, position, and morale, are quietly ignored. Allowing, however, that in some future state cavalry do charge with the solidity and regularity of brick walls on a specially prepared battlefield, it stands to reason that the brick wall furnished with long spikes will knock over the brick wall furnished with short spikes before the latter reaches the former. Putting aside vague theories, let us each, inf ntryman, artilleryman, or cavalryman ask ourselves the simple question, "In the day of battle would you rather see a regiment of lancers or a regiment of swordsmen charging suddenly down on you? For your own side, would you rather see a regiment of lancers gallop past you to reap the effects of your victory, or a regiment of swordsmen? Which instinctively strikes you with a feeling of awe and fear in defeat? Which fills you with a feeling of pride and confidence in victory?" I think few who have stood on the field of battle and watched the two will take long to decide. "Une forêt de lances inclinées sera toujours d' un puissant effet moral sur l' ennemi," as an officer writes from the bloody field of Königgratz.

That brings us to one of the strongest points in favour of the lance: its great moral effect. It is all very well to pooh-pooh and ignore this most important factor, to say that moral effect is nonsense, and that, after the first encounter, commonsense teaches the soldier to discriminate between real effect and moral effect I have heard people say that artillery is nothing but a gigantic bogey used to frighten the enemy, and bear out their statement by showing how very small the result in killed and wounded is from artillery fire. Quite so, but for all that, its moral effect is undoubted, and no nation dreams of abolishing its artillery because it doesn't kill enough people. A dead man is less harmful than a frightened man, for death in battle is not contagious, whereas fear is to an appalling extent. Even so with the lance, its bitterest opponents unite in acknowledging that the lance has a very great moral effect. It will be objected by many, that its moral effect will vanish, if the lance is placed in the hands of men who are not experts with it. I quite agree. The reputation of the lance has been made by lancers born and bred, by the knights of old, by the Poles, by the Cossacks, by the wild horsemen of the East, and again and again has that reputation been shattered by amateurs, who took to the weapon and found, not it, but themselves, wanting. The French lancers in the wars of Napoleon often slung their lances and drew their swords; it was a strange weapon to them. The New York lancers in the 1863 war, in charging through a thin wood forgot to raise the point of their lances, and about four-fifths of them were swept off their horses; their lances catching between two trees, and forming thereby an impassible barrier for their bodies, whilst their horses galloped on from under them. The moral effect very naturally departs, when lances are thus unfavourably handled; but it is hardly fair to condemn the weapon wholesale in consequence. De Brack, after a good deal of sound argument in favour of the lance, sums up in favour of having the front rank of each regiment armed with lances and the rear rank with swords. Another author advocates having two squadrons of lancers and two of swordsmen in one regiment. The Italians go further, and advocate the formation of brigades, consisting of one lancer regiment and one regiment of swordsmen. Martray, though acknowledging the excellence of the lance, deprecates its use in a short service army. A lancer should be a man born to the weapon or with long service to learn it in. Montécuculli, the great advocate of the lance, perhaps argues too much from the lance *v.* sword point of view, a line which we have already deprecated. An anonymous writer, who was urging the French king in 1756 to re-arm his cavalry with the lance, states that the French cavalry had always filled a more glorious rôle with the lance than with the sword. As far as our researches have led us, Captain Nolan stands alone in absolutely discountenancing the use of the lance by all soldiers. The very large majority of writers, both practical and theoretical, favour the lance as a weapon for cavalrymen, whoever they be; whereas an overwhelming consensus of opinion points towards arming men born and bred to use the lance with that weapon.

There are now in India, I was going to say dozens of regiments, at any rate a round dozen of regiments, composed of men, who, if not actually born and bred lancers, yet are men to whom the weapon is familiar from childhood upwards, and who could in the course of a few years be made into such lancers, as could show the way to any lancers in the world, German, French, or Cossack. Without in the least wishing to draw invidious comparisons, but rather with a view to showing up more clearly the distinctly elevating effect which the lance has on the native cavalry soldier, we have only to notice the entire change which comes over the spirit and bearing of a regiment, directly they are turned into lancers. Regiments which before were one of a crowd and possibly rather low down in that crowd, suddenly leap to the front in public estimation, directly they get the lance and have to live up to it. All the dashing young bloods try to get into it; all the smartest subalterns compete for vacancies in it. Take the lancer regiments of the Bengal army: are they the pick of the cavalry regiments or are they not? Now, if it is acknowledged that the lance effects such a marked improvement in the general bearing and composition of a regiment, and such acknowledgement it is difficult to withold, why should not more regiments be raised to this same high level? Being a cautions nation, and ever fearful of spending a shilling, though our wealth is vast beyond the dreams of avarice, all things with us have to be done very gradually, so that the expense may be spread over a long period. Instead of manfully spending our shilling down on the nail, and all at once, as other nations do, we more frequently spread the expense over a series of years, and spend our shilling gradually at the rate of two pence per annum.

So with the lance, instead of going with the times and lumping for one weapon or another, we allow it to filter in, in a surreptitious and half unauthorized manner. The Colonel of a regiment, on his own responsibility and expense, arms the front rank of his regiment with lances, possibly by the personal influence of the some one high in command. After several years, this regiment struggles manfully into the ranks of the lancer regiments. Why all this difficulty? I am sure I cannot think, unless, as I said before, the expense is what stands in the way. Curiosity has impelled me to calculate out the possible cost of turning a regiment into a lancer regiment. If I err not, it would cost about £125 per regiment, and twenty regiments would therefore cost £2500. Surely this is not much for the richest nation in the world to spend upon such an important matter. Every new experience shows us more clearly, how eminently suitable the lance is for our Indian warriors, and the overwhelming wave of European opinion cannot have failed to have driven the conviction further home amongst soldiers of learning and experience. We have at this moment four regiments of Punjab Cavalry, the Guides Cavalry, Central India Horse two regiments, Hyderabad Contingent Cavalry three regiments, and the 12th, 15th, 16th and 17th Bengal Cavalry, in all fourteen regiments composed of men with an unmistakable penchant for the lance: why not therefore for once in a way spend our shilling all at once and arm them with it; raising our cavalry at once to a degree of excellence unsurpassed by that of any nation? Surely it behoves us to profit by the experience of past masters in the art of war; when men like Napoleon and Marmont exclaim, after years of gigantic warfare, that the only way to meet the lance is with the lance. Surely we might profit by the lesson taught them, instead of insisting on proving again in our own persons the truth of their conclusions.

The greatest success attends those who profit by a study of the errors of the past, learning thereby to avoid them, not those who, ignoring the past, follow unheedingly the same path as their predecessors, falling into the same errors and reaping the same reward.

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"ARMY ORGANIZATION."

A paper read at the United Service Institution, Simla, on September 17th, 1890, by Colonel P. J. MAITLAND, Bo. S. C.

Lieut.-General SIR GEORGE CHESNEY, K. C. B., R. E., in the Chair.

GENTLEMEN,—When Colonel Lance gave a lecture in this room some months ago, he prefaced his remarks by pointing out that the object of lectures delivered under the auspices of the U. S. Institution was much less to impart information or instruction than to raise points for discussion. I trust, gentlemen, you will bear that in mind throughout what I am now about to say. My object is to present certain things to you in such a manner as will lead to their profitable discussion by the many experienced officers here present.

The subject on which I have been asked to come and speak this afternoon is one which I am afraid will not be so interesting as some of those on which lectures have been delivered in this hall. There is, however, I venture to think, no military question of the present day more important than that of the general organization of an army; and what I am now about to do is to attempt to place before you, in what I fear will be a very imperfect fashion, the .principles which govern the organization of modern armies, with the view of course of applying them, so far as they can be applied, to the organization of our own army in India. What I want to do, in fact, is to speak of the general principles of organization in a practical manner.

The great development of the art of war during the last 20 years has among other effects raised organization to the rank of a science not less important than those of strategy and tactics, with both of which it is indeed intimately connected. Nevertheless it would seem that, while the latter have been, and are, eagerly studied, organization, or the method of constructing the weapon which strategy and tactics teach us how to wield, has hardly received sufficient attention. It will perhaps be allowed, however, that it is as important we should know how to form an army of the isolated units called battalions, batteries, and so forth, and how to place it in the field; as it is to understand how to convert the raw recruit into a trained soldier. Now, if you will permit me, let us begin quite at the beginning, and let us consider first of all what an army is for. I must beg your pardon for asking you such a question, but perhaps before we have done, you will see that it is not altogether superfluous. There is, I venture to think, a certain confusion of ideas on this subject, principally of course among the general public. Yet, it is absolutely necessary to be clear on the point before proceeding further. What I wish particularly to bring to your notice is that, according to the theory and practice adopted by all the great military nations, an army exists for war and war alone; it does not exist to maintain the authority of any Government whatsoever in its own country over its own subjects. In India we have not unfrequently heard of what are called peace requirements. Now, I venture humbly to state, that military science recognises none such, nor, I think it may be added, does the science of political economy. If there be no possibility of war, there is no reason for the existence of an army. It is sufficiently obvious that in any country, even in India, where internal disorder alone has to be guarded against, so costly and complicated a machine as a modern army is unnecessary, and a burden on the state. You will see that I am drawing a very sharp distinction between a modern army and an armed force for the preservation of order; and this distinction lies chiefly in the fact that the one is organized and the other is not. For an example of a modern army, I am afraid we must go to one of the nations of the continent of Europe, not necessarily to Germany, nor even to any one of the great powers. Some of the smaller states, as for instance Bulgaria, give us a very good example of a modern army. On the other hand, an excellent specimen of what I call an armed force for the preservation of order, is found in the large body of military police we have raised for the purpose of supporting civil authority in Burma. But perhaps some of you will say—"Oh, the Burma military police is organized." I must beg your pardon there. The Burma police is not organized as an army, and I think it must be allowed that a number of isolated units—battalions, batteries, and so forth—scattered over a country, are no more an army than a number of armed men scattered about in a district can be called a regiment. Let it be allowed then, that a modern army existing for war alone is a highly organized machine. From this is drawn the inference, which is also acted upon to the fullest extent by all military nations, that war is to be considered by an army as its natural state of existence, peace being a more or less prolonged interval which is to be employed in preparation for war. If armies could be raised and sent to war without preparation, there would be no justification for their existence at all in time of peace. Now, an old idea was, I think, that peace was what an army existed for, war being treated as a sort of accident which had to be looked upon as a thing apart, and which necessarily involved an entirely fresh set of arrangements, having but slight connections with the previous ones.

Of course, so long as such an idea existed, it is certain that no organization or attempt at it could produce an army in a really high state of efficiency; in a condition, that is, in which the latent power of the army is so handled and distributed, that the largest amount of potential force may be got out of it in the shortest possible time. Nothing else than this is what the state in its own interest should, and ought to strive for, by every means in its power. Now, here I want you to pardon me if I make a few remarks parenthetically with regard to the use of the word "efficiency." I want to bring to your notice the rather important fact, that the efficiency of an army taken as a whole is a very different thing from the efficiency of the units of which it is composed. I think it is not altogether an uncommon mistake, in fact it is a mistake commonly made by the public, that because troops are efficient, therefore an army composed of them must also be efficient. Well, I venture to think, and I think also on consideration you will agree with me, that that is a very erroneous idea. I think it may be safely asserted that, in the army commanded by Marshal Bazaine at Metz in 1870, the majority of the individual battalions, batteries, &c., were perfectly efficient and equal in most respects, if not in all, to those of the Germans; but the army as a whole was of decidedly inferior efficiency by reason of its defective organization and consequent want of mobility.

Having thus far cleared the ground, I will now try to sketch for you the general organization of a modern army. In the first place, you all know that one of the great principles on which armies are now organized is that of low peace effectives and very large reserves. The system is, as you are also quite well aware, to keep men only just sufficiently long in the ranks to give them a good training as soldiers: they are then passed into a reserve which may be called the first reserve; generally it is called, I think, "the reserve", and nothing else. The use of this reserve is of course to bring units on mobilisation up to their war strength, and also to form the depots by which they will be fed and maintained at that strength throughout the campaign. That is the use of the reserve properly so called. The term of service in the reserve is generally as long or a little longer than that in the ranks. In Germany, for instance, men are about three years with the colours, and then for about four years in the reserve. In this four years they only get two trainings, neither of which may exceed 8 weeks. Practically, I think half the men are called up for about six weeks in each year during the period of the autumn manœuvres. After their four years in the reserve the men pass into the landwehr or militia, about which I shall presently speak.

The source from which the material, that is to say the men, is derived to supply the losses of troops in the field, that is to make up the waste of war, is what is commonly called the Ersatz Reserve. This consists of men who have *not* passed through the ranks: they are drawn, first of all from the superfluity of the yearly contingent of recruits, that is to say those men who are over and above the fixed number required to make up the peace establishment of the troops; and also of other classes, such as men excused for family reasons, men who are what is called "conditionally fit," *i. e.* those who have slight physical defects which do not prevent them from being able to go through a campaign; also of men who are put back as being "temporarily unfit," that is to say, who have had some illness, or possess some bodily defect which temporarily incapacitates them for service, and which they may be expected to recover from. All these different classes are placed in the Ersatz Reserve: they serve in this reserve for a certain fixed term of years, I think from 10 to 15 years in different countries; and while they are in it, they are called out for a certain number of trainings. In Germany the period is 12 years, and in that time they go through three trainings,—only three remember, of which the first lasts 10 weeks, and the other two are for shorter periods. The first training is generally in the first year of their service; but afterwards they get two more trainings, one of six weeks, and one of four weeks, and that is supposed to be sufficient instruction. Of course, when they are called up in the event of mobilisation and join the regimental depots, they may get three months or six months, or perhaps even a year's additional training, before they are actually sent to join troops in the field. I have been particular in mentioning the Ersatz Reserve, because questions connected with the reserves of the native army are now under consideration, and our reserve, although it consists of men who have been through the ranks, answers to the Ersatz Reserve, because it is intended to supply the waste of war, rather than to bring battalions up to full strength on mobilisation, the latter function being performed by that one of the three linked battalions selected to form the depot. After a man has passed through the ranks and also through the reserve, he goes into what in Germany and in Austria is called the landwehr, and in other countries the militia. The German organization has I think been very closely copied in this respect by all other nations. The landwehr was originally a home defence militia, and I think answered very closely to our British militia. It is now a period of service as well as a distinct force, that is to say, a man who has passed through the reserve and ceases to be liable to serve in the first line, goes at once into the landwehr, and serves in that for a further period. This period is commonly divided into two parts, during the second part of which he is not called out, if it can be avoided, except for the actual defence of the country. But with regard to the first period of landwehr service, all the men are called out on mobilisation, and they are formed into battalions, squadrons, batteries, and so forth, having as nearly as possible the same organization as corresponding units of the first line. I think it may be said, as a general rule, that the second line or reserve troops have about half the total strength of the first line, and they are organized in a corresponding manner; that is to say, an army corps district, which turns out a complete army corps on mobilisation, will also turn out half an army corps, that is a complete division, of second line or reserve troops a few weeks after the army corps has marched. Finally, there are the territorial, or home defence troops, called in Germany the landsturm. These comprise every male citizen up to a certain age, *including* all those who have passed through the militia or landwehr. These matters are all well known to you. I do not think there is any novelty about anything of this kind to anybody here present. But what I should like to touch upon very briefly, before I go any further, is the organization of the mobilised troops. You are all aware that an army corps consists, as a rule, of two infantry divisions, and that each division has two brigades. In some countries we occasionally find army corps consisting of three divisions. Nevertheless, the general rule is, that an army corps has two divisions, and it is also a general rule that each infantry division has two brigades, and that each brigade has two regiments. I think that is almost universal. Regiments on the continent, as you are also very well aware, consist, not of one battalion as with us, but of a number of battalions; and this number of battalions has, I believe, been steadily increasing since the beginning of the century. I think, subject to correction, that Napoleon's regiments generally had, or at least very often had, two battalions. Twenty years ago it was most common to see regiments with three battalions, and now there is a strong tendency all over Europe to have regiments of four battalions.

Consequently, the brigade, which used to contain six battalions, now very often has eight. Divisions, instead of 12 or 13, have 16 or 17 battalions; and army corps, instead of 25 or 28, now amount sometimes to 32 or 33.

With regard to artillery, the proportion of this arm to infantry has been increased, chiefly I think, from its correct tactical use having at last been discovered. It seems curious, that the real tactical use of artillery should only have been hit upon quite recently, that is to say in the Franco-German war. It is well known that the artillery in the Prusso-Austrian war was not a success. After the conflict was over, the artillery officers and the head-quarters staff of the German army set to work to discover the reasons for the failure; and from what Prince Kraft, whose letters I am sure are familiar to almost everybody here, has told us, it seems that the great reason for the failure of the artillery in 1866 was its want of mobility and backward position in columns of route; and that its conspicuous success in 1870 was principally due to its forward place on the line of march, and the increased mobility to which it had attained, combined with the determination to use that mobility to the utmost possible extent. I think you will all agree with me that it is all very well to lay down the principle, that artillery should be massed at the commencement of an action, and should prepare the way for the infantry attack, and to say (what we all know to be true) that infantry attacks are very unlikely to succeed unless preceded by this powerful artillery fire. I say it is all very well to lay down this principle, but it will not be of much avail unless the artillery are capable of acting up to it. The artillery of Germany and other continental nations is now prepared to move in groups of several batteries for very long distances at a rapid pace. The consequence is, that the sound of the first cannon shots at once brings up the greater part of the artillery of an army corps to the spot, and this enables that powerful preparatory fire to be opened, which is so much insisted on as an essential preliminary to success. I do not mean to imply, that the British artillery is not prepared to do the same thing. Our artillery is an arm we are all proud of, and it has always been famous for the manner in which it has supported the other arms. I am sure that, when the time comes, the British artillery will be, as it has ever been, where it is most wanted.

As to the actual organization of the artillery, we find that throughout the continent it is formed in regiments, each regiment consisting of several groups of batteries, which in Germany are called *Abtheilungs*, and which I almost think we might term battalions. The *Abtheilungs* in Germany used always to have three batteries each, but as the number of battalions in a regiment has gradually been increased, so has the number of batteries in *Abtheilungs*; and we now find some of them have four batteries. If the war preparations of the great empires of Europe go on, I think it quite likely that, before very long, we shall find that four will be the normal number of batteries in an *Abtheilung* all over Europe. Two or three *Abtheilungs* form a regiment, and in Germany and France two regiments of artillery form an artillery brigade, which is the complement for an army corps. You are all aware that the artillery of an army corps is divided for tactical purposes into three bodies: divisional artillery with each division, and the corps artillery. Consequently this organization in a brigade of two regiments is far from being theoretically perfect. In Germany the corps artillery has to be formed by taking one *Abtheilung* from each of the regiments. In France one complete regiment forms the corps artillery, and the other is divided between the divisions. If Prince Kraft's ideas are carried out, as I think is very likely, we shall before very many years see artillery brigades formed of three regiments, of which two will be divisional artillery and one the corps artillery, and that this regiment of corps artillery will be *horse artillery*, the object being that it should make its way to the front and support the artillery of the division first engaged with the utmost possible rapidity. All the authorities on artillery lay very great stress on the importance of having corps artillery, and also of having it as mobile as possible. Prince Kraft, I think, mentions a general at the siege of Paris, who, whenever there was an alarm, used to call for his boots and the corps artillery simultaneously!

Now, gentlemen, with regard to the cavalry. Cavalry, as you all very well know, is now mainly employed in divisions; and these divisions have the same strategic status as army corps. This is a point which I want to bring to your notice very particularly. Divisions are not, as a rule, and never in Germany, attached to army corps. They have complete independence; and the general commanding a cavalry division reports direct to the commander of the whole army. This rule is the outcome of experience, for it has been found, that when bodies of cavalry are attached to an army corps, they serve that army corps and not the army at large. This limitation of effort lessened their use and value to a very material extent, and it was found that combined action among the bodies of cavalry covering the advance of an army was the exception rather than the rule. For this reason all cavalry divisions now receive their orders only from the commander of the army in the same way as leaders of army corps. But the information collected by cavalry divisions is of course transmitted to the commanders of divisions and army corps immediately following behind them; although the commanders of the latter have no power to give directions to the leaders of the cavalry divisions. The strength of cavalry divisions is rather an important point. In the late Franco-German war there were cavalry divisions of all sizes, from four or five, to as many as nine regiments in one case, that is to say from 16 or 20 squadrons to 36 squadrons. But I think I am correct in stating that the German authorities now lay down the normal strength of a cavalry division at six regiments or 24 squadrons, with one or three batteries of artillery; 24 squadrons is, I think, the generally accepted strength of a cavalry division all over the continent of Europe. In countries, whose cavalry regiments have six squadrons, as in Russia for instance, there are only four regiments in a division instead of six, but in all cases it seems to be agreed that 24 squadrons is about the utmost that can be properly manœuvred as a division. Cavalry divisions of six regiments are always divided into three brigades, each brigade of two regiments or eight squadrons. This is of course to provide the three lines considered essential to the tactical handling of cavalry. There were many brigades of three regiments in the Franco-German war, but they seem to have been entirely abandoned. The Russians, who have regiments of six squadrons, have only two brigades in a division, but they hardly pretend to be anything but mounted infantry. As to divisional cavalry, it appears to be the tendency of the present day to diminish it, partly no doubt with the idea of making up as many divisions as possible to form the cavalry screen, to which so great importance is now attached.

Of course, gentlemen, if I was to go into all the details of organization, interesting as these are, and to the minor differences which exist between the armies of Europe, you would very soon get tired of listening to me. I have, however, thought it necessary to sketch, in this very slight and imperfect manner, what is the general organization of modern armies as preliminary to a very important part of the subject, to which I am now coming.

There is one condition which is universally recognised in the organization of the army of every state, which has any pretentions to rank as a military power, and also in some who have no pretentions in that way at all. It is, I think, not too much to say, that this condition exists in every army whose efficiency is of vital importance to its country, and it may therefore be regarded as an essential factor in producing that efficiency. This condition is, that the war organization of an army is precisely the same as the peace organization. What I mean to say is, that the army corps, divisions, and brigades, of an army, with their staffs, trains, and subsidiary organizations, exist in peace just as they do in the field. The only difference is, that in peace they are at a low strength of men and horses, while on the outbreak of war they are brought up to full strength by the absorption of the reserves, which exist for that very purpose, as we have already seen. It is I think quite obvious, that this difference is one of degree and not of kind, and that the fact of the organization of the army being permanent is one even more important to its efficiency than its mere augmentation in numbers by the raising of units from peace to war footing. Yet there can be no doubt, that the latter has attracted vastly more attention than the former; and it is not difficult to understand why this should be so, as people in general were naturally impressed by the spectacle of a comparatively small army being suddenly expanded into a very large one. Of course numbers are a very important consideration, but they are not the only one, and no strength in numbers, no individual bravery, not even excellence of individual units, will make an army really formidable in the field unless its organization has been brought to a high pitch of perfection. And the required standard cannot, I venture to submit, be attained, or even approached, unless the organization, in which the army is to take the field, is maintained in time of peace. Every Englishman knows the difference between a scratch eleven, a scratch team, or a scratch crew, and one that has been trained and practised together. It is the same in the tremendous game of war. A permanent organization, in which the same troops are always kept together, are worked and trained together, and take the field together under the same leaders and staffs as have directed them in peace, naturally provides a more efficient army than when no organization exists in peace, and mobilisation brings strange troops together under unaccustomed leaders.

The system, first invented by Prussia, and which led to such startling results in 1866 and 1870, has now been adopted by all the nations of any military importance on the continent of Europe. Under this system, the country is divided into large districts, corresponding, if possible, to provinces, each of which provides an army corps; and these large districts are divided and sub-divided into smaller ones, which furnish divisions, brigades, and regiments. The troops are permanently stationed in their districts, and if possible recruited from them. They are brought together almost every year for manœuvres, the ordinary or first reserves being at the same time called up for training, so that all units are brought as nearly as possible to war strength; and they are practised in precisely the same organization as that in which they will take the field, under the same generals. The consequence is an amount of cohesion among the units composing brigades, and even divisions, which we are accustomed to look for only in regiments; and I think it is difficult to overestimate the importance of this cohesion, and the actual increase of fighting power thus obtained. In fact, continental troops now start for a campaign at a point of organization, which we do not reach till we have been months in the field; and although it may be that wars will last in future a much longer time than the startlingly short conflicts of 1866 and 1870, yet I think no one has denied the great importance attaching to the result of the first engagements. We may make plans for offensive strategy, and quite settle in our own minds that we mean to take the initiative (as was the case with the Prussians in the Jena campaign), but whether we can really do so or not depends in a great measure on the results of the first collisions. If we are beaten in these, we must, I think, be forced into the defensive, and it may be a long while before we should be in a position to resume the strategic attack. Besides, we have, in India, to consider the effect on the country of reverses at the outset of a campaign. It is, therefore, I venture to think, desirable to use every endeavour to be successful, in a war with a European enemy, from the very commencement of the contest.

Now success in the first collision will mainly depend on two things.

First, on superiority in numbers.

Secondly, on superior fighting power.

I am of course obliged to leave out the influence of superior skill on the part of the general, which may be shown both strategically and tactically. We feel, I believe, pretty confident that we shall be well led, but even the best general cannot make bricks without straw: he cannot win battles, unless he has a sufficient number of good and mobile troops wherewith to carry out his combinations.

As to the numbers we may be able to put into the field, that is not a point which can be entered into in this lecture. I will only remark, that the more highly organization is carried, the more rapid will be the mobilisation of the field army, and the better chance we shall have of getting a sufficient number of troops to the front, early in the campaign.

As to the superiority in fighting power, we have a fairly well founded confidence in the excellence of our soldiers, and of individual units, that is regiments and so forth. But in the present day this is not enough. If we are going to fight a European power, our troops must be as highly organized as those of that power. Otherwise, I am afraid we shall find the scratch crew will be at a disadvantage compared with the one, which has been long in existence, and is accustomed to work together. I am afraid it is possible for a brigade or a division, which has never been assembled till it finds itself actually in the theatre of war, and which probably goes into action without having had so much as one single field day together: I say, and I think you will allow, that it is possible for this brigade or division to be beaten by a force of equal strength of somewhat inferior material, if this latter force has been long in existence, and has been accustomed to work together for a portion of every year under the same leaders and staffs as actually command it in the field.

My contention is then, that the time has arrived when we should consider the best method of giving our troops a permanent organization. I mean an organization which shall exist in peace as in war, and by which the field army will be mobilised, not by a violent transition from the normal state of affairs to one totally different, but in which already existing brigades and divisions shall be raised to war strength, receive their field equipment, and take the field as they stand under their own generals with a rapidity and smoothness unattainable in any other manner.

There is, I think a very wide-spread idea that, although such an organization as this is theoretically excellent, and is rightly adopted by the military nations of Europe, it is unadapted and unadaptable to our circumstances in India. So far from this being the case, a practically permanent organization can, I venture to think, be even more easily adopted in India than it has been by countries on the continent of Europe. We have two great advantages.

One is, that our units are on a much stronger peace footing than those of European nations.

The other, that the units, besides being stronger, are not so much broken up.

I dare say this last remark will excite some surprise, but I can assure you that in most continental countries the units are very much broken. In Austria and Russia, for instance, the cavalry is generally cantoned *by squadrons*, often scattered rather widely apart, and the commanding officer only gets his regiment together when it goes into camp or rather bivonac, for the yearly manœuvres. And it is much the same in the case of the infantry: battalions and even companies are separately quartered and only come together once a year for a few weeks. I wonder what most of our commanding officers would say, if their men were quartered, and often not even in barracks, but billeted, in three or four different towns and large villages for ten months out of the twelve.

The reasons why, with this drawback, and also that of the very short service now universal, the continental nations contrive to have well trained troops in large numbers is, first, I think, on account of the excellence of their regimental system, which places the entire drilling and training of the men in the hands of the company and squadron commanders, and, secondly, the superiority of their organization by permanent brigades and divisions, which, however broken up they may be in quarters, are still always under the same command, and are actually brought together during some portion of each year for manœuvres.

Well, if this can be done on the continent, in spite of the wide distribution of units, surely it would not be impossible for us to arrange for our battalions and cavalry regiments, which are not as a rule broken up, to be formed into practically permanent brigades, and the brigades to be regularly united for drill and manœuvres for a month or six weeks in each drill season?

On the continent they have not only to unite regiments as well as brigades and divisions, but the peace footing of the infantry is so low, that they can only get units approaching war strength by incorporating a large number of reservists. This trouble we should entirely avoid.

Another point I might mention is, that the season during which troops can be kept under canvas or in bivonac, and consequently the time during which the brigades and divisions will be actually together, is much longer with us than on the continent, where I think I am correct in saying it is confined to a few weeks after the harvest; we are also not restricted in the length of time a concentration of troops may be continued by the necessity of letting the reservists return to their homes.

Of course, to enable us to have a practically permanent organization, a certain redistribution of commands and some measure of localisation would be necessary. These do not appear to me to present any insuperable difficulties. We have now six first class districts, including Quetta, and eight second class. But suppose Northern India, irrespective of Quetta, were divided into six first class or divisional districts, and each of these again into two sub. or brigade districts. As only one of these in each divisional area need be commanded by a Brigadier-General, we should have six first class and six second class districts, and also Quetta; altogether thirteen commands against the existing fourteen. The first class, or divisional, districts could each supply a complete infantry division of two brigades. These divisions would certainly be smaller than those contemplated under the existing scheme of mobilisation, but larger than any divisions we have hitherto put into the field. As each district could make its own arrangements, mobilisation would be very easily and quickly effected. And more than this, the component brigades, including artillery, could be brought together every cold weather for combined exercise, at I think little greater expense than is now incurred.

I think two objections will be raised to this scheme. The first will be that the districts, each as large or larger than half a province, will cover too extensive an area. But I think that, considering almost every station is on a line of railway, and also that the General Commanding will have the assistance of a Brigadier, who will look after half the district, no real difficulty is likely to arise on that score. For instance, out here the Inspector-General of Artillery and the Inspector-General of Cavalry each have a district, one may say, as large as India itself, and although it is impossible for them to inspect every battery and every cavalry regiment every year, still they see a good many of them, and find time for camps of exercise besides.

The second objection will, I think, be as to reliefs. I dare say many of you have already been thinking, "this is all very fine, but what about reliefs." Well, gentlemen, we already confine Punjab troops to the Punjab, and Hindustanis to Hindustan, a measure which was thought impracticable not so many years ago, and there may perhaps be no great difficulty in limiting troops, as *a general rule*, to such an area as a divisional district would be. I am far from supposing that a hard and fast rule could be laid down restricting troops, and especially British troops, to specific divisional districts. But this I will say, that, subject to general convenience, troops may be retained, not only in divisional, but in brigade areas, for a considerable length of time. Every now and then some unit would be moved into another area, but this would not affect the general continuity of existence, nor the practical permanence of the brigades and divisions as such. You will remember that a regiment or battery going home is none the less the same regiment or battery that came out, because every man in it may have been changed twice over during its term of service in India.

A third point which may be raised will be with reference to the garrisons. It will perhaps be said that, with the introduction of a permanent organization of brigades and divisions, a certain number of troops will be permanently relegated to garrison duty. There is no necessity for that at all. Any scheme of mobilisation must go by stations, and certain units at certain stations must be detailed to remain in India, when mobilisation takes place. I should not propose to make any real difference in this respect. All units would get their turn of the places involving garrison duty, and would be for the time excluded from any brigade, although regiments and batteries in this position might very well join the nearest brigade for manœuvres, at the discretion of the divisional commander. And such units would always have the chance of taking the place of a sickly, or otherwise inefficient, unit of the same arm, on mobilisation.

I would further observe that a permanent organization would not, as I think I have heard it asserted, at all militate against the carrying on of the little wars and expeditions, in which we are so constantly engaged. In very small affairs in which only one or two thousand men of all arms would be engaged, there would obviously be no practical difference between the existing state of things and that which I have ventured to propose. In larger expeditions, it would certainly be convenient, though by no means absolutely necessary, to mobilise the nearest brigade, or brigades, of the standing organization, and some useful lessons would no doubt be learnt by consistently following this practice. But it would be equally possible to pick and choose units of every arm from every district, if it appeared advisable to do so.

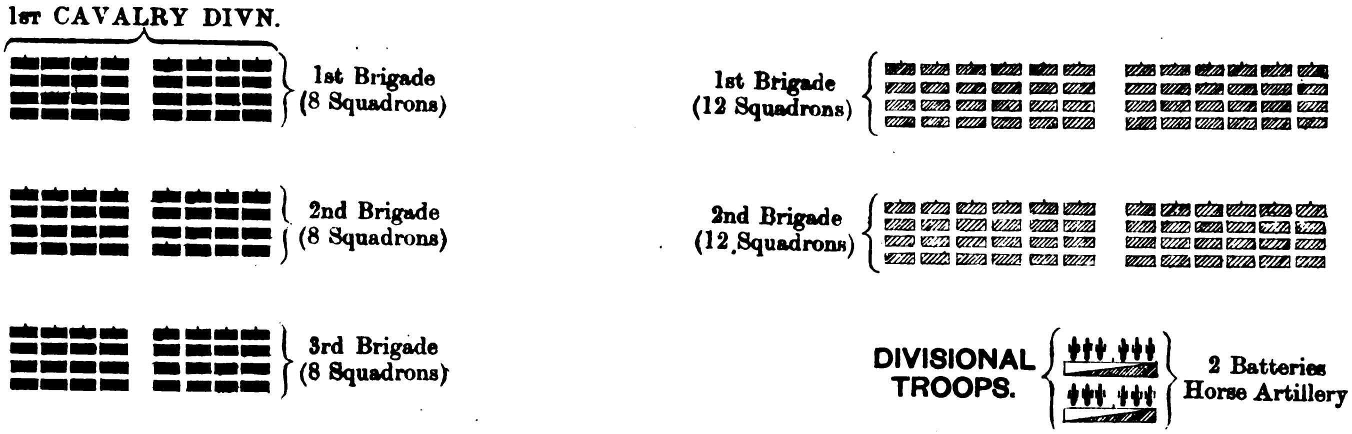
I do not conceal from myself that, in addition to redistribution of command, and a moderate degree of localisation, a certain redistribution of troops will also be necessary. This would mainly take the form of an increase to the number of troops stationed in the western part of the Punjab. The increase would not be large, nor would the expense be great. We have just seen Russia moving troops by the hundred thousand towards her exposed frontier. It is therefore, I think, not unreasonable that we should, under existing conditions, so different from those of ten years ago, also concentrate towards the side from which danger is expected, and to which the field army must move in the event of mobilisation.

Your Excellency, ladies, and gentlemen, I have now to thank you for the kind attention with which you have listened to a discourse on what is probably to many of you a dry and uninteresting subject. I cannot conclude with so stirring a peroration as that, with which my friend Major Barrow closed his lecture of the week before last, but I may say, what I am sure you will all agree with, that there is no subject of more importance, not only to us soldiers, but to the whole of this vast and teeming empire, than the fighting efficiency of the army which has to protect it against foreign aggression.

Here, gentlemen, we all feel, and I am sure none more deeply than those who are in the positions of the highest responsibility, that it is on the army that the very existence of this empire will in the future depend. Here we have no silver streak to bar the invader's way, and no fleet to act as a first and most important line of defence. The army of India stands alone as India's rampart. And if that rampart is broken down, farewell to the progress and enlightenment of this country, for which three generations of self-sacrificing Englishmen have toiled, not unsuccessfully.

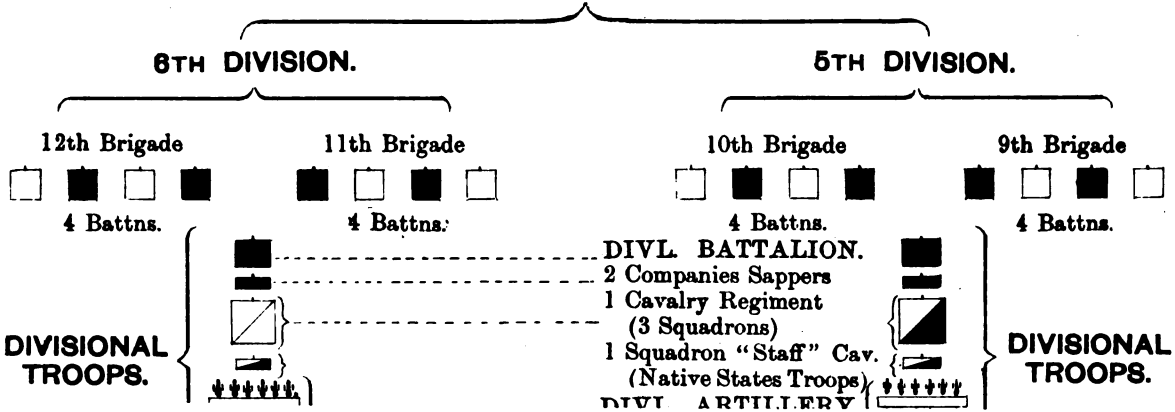
Gentlemen, the efficiency of the modern army lies, in my humble opinion, mainly in its organization. The sword must not only be of the finest steel, but it must be perfectly forged, or it will break in the battle. Let, however, the weapon be thoroughly wrought, and we have no fear but that it will be effectively wielded.

CAVALRY DIVISIONS.


1st CAVALRY DIVN.
1st Brigade (8 Squadrons)
2nd Brigade (8 Squadrons)
3rd Brigade (8 Squadrons)
1st Brigade (12 Squadrons)
2nd Brigade (12 Squadrons)
DIVISIONAL TROOPS.
2 Batteries Horse Artillery

III ARMY CORPS.

III ARMY CORPS.



THE MILITARY TRAINING OF JUNIOR REGIMENTAL OFFICERS.

Paper read at the United Service Institution, Simla, by Captain A. C. MacDonnell, R. E., D. A. A. G. for Instruction, on 4th October 1890.

Major-General W. K. Elles, c. b., Adjt.-Genl. in India, in the chair.

The Council of the United Service Institution of India having done me the honour to invite me to give a lecture, I am sure you will agree with me that the subject I have chosen is of such importance not only to the service generally, but especially to us in India, with the training of our native officers before us, as to warrant my bringing it up at the present moment for discussion.

I do not in any way propose to find fault with our present regulations on the subject, quite the reverse, but it is rather to the system in which these regulations are carried out that I would like to direct your attention.

I think I may be allowed therefore to fully point out or discuss any disadvantages of the present customs of the service that may occur to me with the view of eliciting criticisms from more experienced and better informed officers than myself.

I will dismiss the question of the competency of the junior officers now joining the army by stating that I believe them fully up to the standard that it is possible to obtain both physically and mentally.

Opinions differ, as they always must, as to the subjects in which army candidates should be examined, the length of time they should remain at Sandhurst, and the kind of training they should have as cadets; but whatever is decided upon for this first training of officers, I do not consider it of any more practical use than being a mere preliminary to the real training they should and ought to get when with their regiments.

Having got such good material do we therefore make the most use of it afterwards? Are junior officers instructed in the art of war when present with their regiments? My experience is that certain portions of the art of war are so taught and very completely, but that some of the most important of all the branches are, from custom, left almost untouched. It will be well to note the subjects in which a junior officer ought to be instructed, and we can then proceed to discuss how each of them can be developed.

They are classified as follows:—

1. Regimental Duties.
2. Drill.
3. Military Law.
4. Duties in the field.

This is the classification laid down in the "Queen's Regulations."

I do not propose here to say much about the present regimental instruction in the first three, except that I believe that there is every facility and incentive to junior officers to make themselves well acquainted with these duties, but it is with reference to the instruction under the 4th heading I would wish to draw particular attention. We have heard a great deal about "*battle training*" both at home and abroad, and everywhere we see the greatest importance attached to it, and I would ask you is it not simply the duties defined "in extenso" in our Queen's Regulations as "Duties in the Field" and which are again subdivided into tactics, field fortification, and reconnaissance? Now although military writers and regulations point out the importance of these duties, do we practically carry out any system of *universal* instruction in them, in our service? As a rule, the regimental instruction to junior officers in such duties is "*nil!*"

I think I am in a position to say this, not only from my personal knowledge of the "régime" of many regiments, but from the absence of even elementary knowledge on the part of many officers who come under me for instruction in these very subjects.

This is certainly an anomaly and I can only account for it in two ways.

Firstly.—At an inspection of a regiment or battery very little if any time is devoted by an Inspecting General to fully ascertaining the knowledge of junior officers, especially company and squadron commanders, in these very subjects.

Secondly.—It is very generally the custom of the senior officers of the regiment to overlook the importance of actually practising and performing these duties in peace time, as far as possible, under the conditions of war. There are of course exceptions, where senior officers endeavour to carry out the spirit of the regulations; but without a corresponding disciplinary *demand* from the Inspecting General, human nature must control the average result throughout the service and cause these duties to be more or less neglected.

With reference to the second cause the arguments usually put forward against carrying out regimental instruction in "Duties in the Field" are as follows:—

(*a.*) There is no time! There are so many things now-a-days to look after that there is no time left for any thing extra.

(*b.*) It is very difficult to get your officers and men together for instruction.

(*c.*) It is very difficult to make out schemes which will commend themselves to every one taking part in the instruction. Every commanding officer does not consider it his duty to act as a personal guide or instructor in tactics to those under him.

Taking objection (*a*) first. This is of course a serious difficulty to be contended against, but I feel quite certain that it is not insuperable.

I conscientiously believe that the officers of our army have their *time* occupied by military work quite as much as those of other armies, but a great part of such time is uselessly frittered away from want of a good regimental system in carrying out their duties. There can be but few circumstances where a programme of instructive practices for the year cannot be drawn up and carried out, and I will endeavour hereafter to make suggestions for this. I would now point out that the present programme of regimental instruction ignores generally that part of an officer's profession which may be called the intellectual part, and which alone will bring out his ever increasing interest in it. Prince Kraft says, in talking about the training of a recruit, that if he sees nothing but the barrack square and his barrack room and is employed only in the most mechanical and elementary exercises he will get into a solid state of mind and make no further progress. But if he has an opportunity of occasionally going out into the open to learn his field exercise, he recovers from the monotony of his elementary training and gets an approximate idea of his work as a soldier together with a fresh desire to fit himself for it.

Now I think the same may be said of officers, who are kept at nothing but their regimental duties and what we have defined in the Queen's Regulations as ordinary drill.

If officers would train those under them always with an idea of a supposed enemy within striking distance, every one would get an approximate idea of his work with a desire to fit himself for it.

I maintain therefore that nearly all the energies and capabilities of our officers are *too much* centred on ordinary regimental duties and mechanical drill and not enough on the intellectual branches. Our time and good material is thus wasted, for many officers, naturally brilliant, have never distinguished themselves simply from want of that preliminary instruction which would have enabled them early in their service to rise above their contemporaries. This evil is reflected on the service; for many years of the tedious routine regimental work naturally disinclines officers to commence study late on in life, and makes them therefore incapable of teaching their juniors.

I am quite sure therefore that time could be saved from the usual programme of instruction in many ways. Hours are spent at the orderly room of many regiments when the same number of minutes would have been sufficient. The duties of *supervision* of cleaning equipment, saddlery, and horses I think are capable of being more quickly performed, and far less time could be spent on drill movements and manœuvres that would never be utilised in the field, for example, all drills at close touch might be abolished, and every thing done at manœuvre (*i. e.* 30 inches) interval.

I believe drills at manœuvre intervals are in many cases greatly neglected, although in all movements for field service the close interval drill has been abolished.

How many hundred times in a year does a regiment generally march past, and how seldom does it practise out posts? "Where there is a will there is a way," and I feel quite sure it only requires careful forethought and arrangement to set aside a few days in the year for such an eminently important object.

See how our musketry is now, very rightly, attended to throughout the service, but side by side by it should march the instruction in tactics; one cannot do without the other. An officer told me once that the whole of his tactics was contained in the words "*good shooting*," but this will be nowhere if it is opposed by good shooting, good tactics, and field fortification combined.

Now with reference to the second objection that officers and men cannot be brought together for instruction. This also is a difficulty, but applies, I think, more to the men than the officers. Neither is it necessary that instruction in these subjects be limited to periods when all the officers and men are available. It is a species of instruction that will bear repetition at different times, being of an interesting and very variable description, and if repeated, will ensure all officers being present a certain number of times, and still not be irksome to those who have attended all the practices.

Neither is it necessary that practices be confined to company units. Valuable instruction could be given, say, by a field officer, to two companies of his wing with each company at only half its strength, also many branches of the subjects can be taught the officers better by taking them out over suitable ground without taking the men out at all. It is urged against this, that it throws extra work on the officers, so it does, but I maintain that such extra work would not be objected to, if it was always carefully prepared by the senior officers beforehand, as officers of all ranks admit that practice in these subjects is imperative, and they would accordingly enter into the spirit of it. My experience, is that, as long as officers feel that they are really being instructed and are improving their knowledge, they are as a rule keener about the work than the instructor. What is more marked than the interest now taken in the tactical and practical use of artillery in the field by almost every officer in our regiment of artillery, and this commenced from the date of the publication of Prince Kraft's letters on artillery? The interest was not merely taken up by instructors or the school of gunnery, but throughout the regiment, and I venture to predict that where such a universal interest is taken in the tactical use of their arm the best result must follow.

Now with reference to the third objection, that it is difficult to make out schemes for instruction &c. It is only an officer who has tried to design schemes for the first time that could say this—practice makes perfect, and it is only practice that is required, nothing complicated is necessary but clear and straightforward projects and the simpler the better: it should, however, be sufficiently explicit to enable each unit, even down to the section, to understand its duties and the position it will take in the manœuvre.

The drill books and the synopsis in the Queen's Regulations give us very completely the different field practices to be performed, but as long as the instruction in them is confined to theory it is worthless. You will all, I am sure, agree with me, in believing that the essence of success in all military training is the actually carrying out, with the strictest discipline, all the above practices regimentally in peace time and to make each manœuvre complete in itself.

I will now endeavour to discuss how we can best do this.

First and best of all is the annual military training of the company. Here is the great opportunity for the company commander, but does he always take advantage of the opportunity, and is he always encouraged and assisted by his senior officers?—If he really instructs his junior officers and men under him, is he always given sufficient credit for it? The instruction of his junior officers should be his first care, and he should make them capable of acting as his assistants in the instruction of his company. Regulations state, that at the end of each month's course the commanding officer should make a most searching examination, testing the knowledge *of all ranks* in their duties in the field; surely if this was well carried out, garrison classes would no longer be necessary! With reference to tactical instruction; take the attack. To make it intelligent to all, it should be explained under what circumstances the attack is to be made, why certain formations are adopted, whether it is to be a delaying action or otherwise, the objective of attack clearly pointed out to all and so on, and when carried out, executed as if under the enemy's fire. Commanding officers should remain in the position they would be on active service and from that position issue their orders. To enable a final attack to be completed, I would advocate having the position marked out by flags, in preference to having an opposing force, and measures always to be immediately taken for securing the position captured. *This* is where discipline is so essential in the issuing of orders and having them promptly obeyed. Take for example the capture of the far edge of a wood, which I venture to say is seldom practised; without these precautions the successful troops may in turn be easily defeated. In flanking movements we find the flanking party too often detached from the main body too late, and it has itself to make a flank march in view of and sometimes in range of the enemy. If practised with a portion of the troops told off as an opposing force, this becomes obvious to them from their position and requires no lecturing to explain it. Advantages of ground can be made use of by considering the enemy's infantry held in front by your artillery, and the company manœuvred, in order to gain a good enfilading position as was so successfully done at St. Privat, by one German company, which forced 9 French battalions to retire from their position.

In outpost duties, the detailing and performance of the duties must be actually and completely carried out. Great practice is required in actually selecting positions for picquets, sentries, and issuing orders to patrols &c. If a reconnoitring patrol has once actually been correctly detailed by an officer and practical orders given by him, he can hardly fail to do the same correctly another time, but I think, many senior officers are wrongly content with an explanation from a junior officer stating that he would do so, instead of requiring him to do it.

In the defence of a position one finds it seldom carried out with a view to counter-attack, and the use of field fortification is absolutely ignored. This can easily be combined with the former exercise on outpost duty by taking the company as a picquet in a general line of outposts and putting its position into a state of defence.

I might mention many other similar points which would carry me far beyond the limits of this paper but for those who would like further ideas on the subject I would recommend them to study "Extracts from an Infantry Captain's Journal" published in No. 157 of the Journal of the R. U. S. Institution, and see what "Major Arnim" accomplished with his Company in 4 days instruction.

In fortification, instruction should be entirely practical, but it is so closely connected to tactics that its tactical use should be kept more in view. Its intelligent use is imperative. A general idea prevails in our service amongst those who have not thought deeply, that field works would always be arranged for by the sappers, and even constructed by them for the infantry and artillery to walk into!—This is of course an entire fallacy as regards field fortifications, which must be designed by the officers on the spot and made by the troops under them. Engineers in the field have sufficiently multifarious duties to occupy them otherwise than to follow infantry in the field and always to be available to make their shelter trenches and obstacles for them.

We have "permanent or semi-permanent fortification" and "Field Fortification:" the latter is what we want to instruct officers generally in, works such as would ordinarily take a day's work or less to complete, and which if once properly constructed in peace time are easily understood. The actual construction of field work details, such as revetments, obstacles, instruction in actual digging, knotting and bridging &c. would of course be better done by the company in its annual military training, but although it is admitted by all officers that there will be a necessity for field fortification in the next war, there is absolutely no systematic army instruction in the tactical use of field works.

I could quote examples without number of the successful use of field fortification in modern warfare, but I am not arguing in favour of what is universally admitted.

I will however draw your attention to two notable examples.

The defence of Plevna has shown distinctly that in future wars fortified positions of the nature of entrenched camps are destined to play very important parts and it is therefore especially important for our small army to be able to commence and complete such works when necessary. The battle of Gravelotte is a striking example of the power of artificial defences; for the Germans never succeeded once in penetrating the French line where it had been artificially strengthened, and the French only suffered defeat on their right flank, which had been completely untouched as regards hasty intrenchments.

In field fortification therefore, the instruction of officers should always be connected with some simple tactical idea which brings home to them their practical use and too much digging for the sake of digging need not be resorted to. On service soldiers will dig well even without practice, and if we demand the actual digging of every shelter trench &c., that we trace out, we would cover too little of the subject. What is most required is the practising of the officers in estimating how many and what kind of works should be undertaken under certain tactical conditions, having regard to the time, labour, and tools available, as well as practice in actually detailing the necessary working parties, and giving rough sketches with dimensions to their subordinates explaining what they want done. Practice is also required in the actual tracing, marking out of work, and extension of working parties on the ground. It is not absolutely necessary in most cases to commence the actual manual labour, but up to that point a very large amount of experience can be gained.

As regards reconnaissance, I have little to say as I believe our standard methods of instruction are sound. At the examinations for promotion credit is given for good reports, and rapid sketching is encouraged, but the sketches must be clear, distinct, and sufficiently accurate for military purposes. The commanding officer should also be called upon to hold his company commanders responsible that the officers who make bad "reconnaissances" are *personally* assisted and instructed. Even the worst draftsman can attain a certain proficiency.

Every officer should be able to read maps easily, and I am in a position to state that there is a great deal of ignorance in this respect. The quickest, best, and most complete way of teaching an officer to read maps is by teaching him to make one!

We should therefore push forward the instruction of officers who are backward, and endeavour to remove the present vicious habit of selecting the best sketchers in the regiment, as has been done in many instances, to prepare the sketches annually required by the general officers commanding districts.

The commanding officer has great facilities for imparting instruction, but as so much can be done with the company unit, he should hold the company commander responsible for correctly carrying out certain manœuvres; for example, if a battalion furnishes an outpost line and a particular company furnishes say two picquets, every mistake made in detailing those picquets with its sentries, and reconnoitring patrols, should be pointed out to the company commanders, who should be responsible that their officers have been properly instructed.

Nearly all battalion exercises might be carried out with the idea that artillery is co-operating and a few men with flags detailed to represent them. These men could be put under an officer and most valuable instruction gained in pointing out how the two arms should co-operate together.

I venture to think that there is a very general want of appreciation of the great moral and destructive effect of artillery firing at long ranges, and especially so when a number of batteries can be massed together. We ourselves have had so little experience of war with good European artillery against us, that we should be very careful of falling into this error, for no amount of practice with blank cartridge in peace time can disseminate, amongst officers of the service generally, a proper appreciation of its increasing power. This latter can only be effected by constantly pointing it out in peace manœuvres and directing instruction especially to it. Success to a commander in battle entirely depends on his just appreciation of the power of each arm under him, and this in the case of artillery must depend on the circumstances under which it is employed. Every endeavour should therefore be made by all officers taking part in any peace manœuvre to estimate the effect of their artillery on the enemy in each phase of the movement.

I believe myself there is more practical tactics to be learnt from studying the co-operation of artillery and infantry than in any other way. With the view of eliciting ideas on the subject I now venture to sketch out roughly a programme of the most important practical exercises of the duties under discussion.

1*st day.*—Officers only. Reading maps and constructing simple scales &c.

2*nd day.*—Officers only. Drawing freehand sections with dimensions of shelter-trenches and breastwork. Calculating roughly, working parties and tools for given length of same.

3*rd day.*—Officers only. Disposition of troops of all three arms on 6″ maps under given tactical conditions.

4*th day.*—Officers only. As above again. Also drafting of orders for a given march and calculating time of concentrating various troops over given distances.

5*th day.*—Officers only. Out of doors. With reference to a particular piece of ground. Arranging a scheme of defence with a mixed force of given strength in a given time.

6*th day.*—Officers only. Out of doors. Detailing advanced guards from forces of given strength and issuing orders for same. Selecting artillery positions under certain tactical conditions. General position of cavalry on the battle field and formations used for charging.

7*th day.*—With troops. Attack of position marked with flags, artillery co-operating, under given tactical conditions. First attack to be repulsed. Second attack to be successful and measures taken for security of position gained.

8*th day.*—With troops as above against a village or a wood.

9*th day.*—Troops. Against skeleton enemy. Reconnoitring through intersected country. Reconnoitring enemy's position.

10*th day.*—Troops. The battalion to be disposed in one of the localities selected for a battalion in the fifth day's projects, and works traced out, working parties told off, and extended on their work.

11*th day.*—Troops. In another section of the same project.

12*th day.*—Troops. With artillery represented by flags A rear guard retiring from a hostile enemy. Successive positions chosen and eventually occupied.

This is of course anything but a complete course of instruction, but it may however serve to direct officers' attention to working out something practical and to make the regiment really the school for learning military sciences, for if the regiment is not made the school, how are officers not only to learn those things, but to keep up with the progress of the day. Garrison classes do something in the way of instruction but *far less* than is generally imagined for the reason that the study and time an officer gives while at a garrison class is a mere flash in the pan when compared to the length of his service. It means at the most that in 18 or 20 years service he devotes four months to the study of certain subjects; moreover many intelligent officers pass direct for promotion without studying at a garrison class, but as a rule without distinction.

These officers, as well as the service, lose the benefits that would ensue if they had previously improved their knowledge by studying at a garrison class; therefore until we have universal regimental instruction I think an officer's desire to attend a garrison class should always be encouraged, but in some cases I believe it is not so.

For further ideas of problems for battalion manœuvres Prince Kraft's "Letters on Infantry," with reference to "Tactical problems,' are full of suggestions.

I *have*, therefore, only proposed a programme with six days for officers alone and six days for the battalion, omitting those necessary for *outpost duties*, which must of course be additional.

Surely this time could be spared by all battalion commanders once if not twice a year?

For the instruction of cavalry and artillery officers by regiments and batteries modifications in the programme would have to be made, but in the cavalry more attention should be given to instructing the officers in "Reconnaissances."

In *all* cases I would strongly advocate that special instruction should be given as to the general formations of the *other* branches of the service and the manner in which they usually co-operate; this I consider a "sine quâ non" in military training, as it is under these circumstances alone that officers can begin to study military sciences in an intelligent manner. I would like to lay particular stress on this point because I have been so often met with the argument that, if an officer is well acquainted with the duties of his own branch of the service only, he is fit for promotion, but I think this is a very dangerous creed. It is while officers are still junior that they should begin to study the working of all arms, if they have any ambition to become competent senior officers, and moreover manœuvres on the battle field being essentially based on combined tactics, no officer, no matter how junior, can perform his duties on service in an intelligent manner without some knowledge of the tactical powers and formations of other branches of the service in addition to his own.

Moreover junior officers never know when they may find themselves in the most important positions, as can be proved by the number of instances recorded in the German official account of the 1870 war. The charge of Bredow's Brigade at Vionville, which practically saved the Prussian 3rd corps from a crushing defeat, was due to the suggestion of a young infantry officer of six years service detailed as a galloper for the day to the staff of a general of division.

The day has gone by when a smart efficient officer was merely required to be an efficient "drill" and a good disciplinarian. He must now before all things qualify himself for imparting his knowledge of duties in the field to those under him, and I venture to think that the selection of officers in the future will depend greatly on their capabilities in this direction.

With reference to the judging of the relative merits of commanders I was greatly struck by a remark made by Major Keim in a lecture delivered before the military society in Berlin, which was as follows:—

"It was perhaps justifiable formerly to attach special value to the ability they displayed on the parade ground, but now-a-days skill in conducting the battle training of troops (*i. e.* what we call duties in the field) should be considered first and foremost, *then* the actual results produced by the training, and *lastly* individual dexterity in troop leading." "If a commander exhibits a tendency to train his men up to the standard of the parade ground rather than to that inspired by the exigencies of battle, he must be regarded as simply failing in his principal duty, that is of imparting a warlike training."

If we keep the point in view that the true method of instruction of all ranks is by actually performing a manœuvre, work, or disposition completely, no matter how simple, and imagining as little as possible, I feel sure all difficulties would be found to disappear, and that we shall find it especially successful in the instruction of our native officers. Lectures to all classes of military officers are, I think, especially distasteful, but if you can take an officer out on a piece of ground and discuss with him how to take up a position there, how you would artificially strengthen it, and how you would actually dispose certain troops on it he will at once begin to grasp the military situation in a practical and permanently useful manner. This form of instruction I believe to be the only form which will ever commend itself to the mind of a native officer.

With regard to "kriegspiel" as a means of instruction, I would like to venture an opinion that it is at present made too tedious to be universally instructive to all officers. It is of course improving to those that actually take part in it and who take an interest in it, but every officer does not do this, and to force an interest by ordering an officer to watch a game which sometimes takes longer to play on the map than would actually be required in the field if carried out in real warfare, is I believe a mistake. I have seldom failed to raise all officers' interest by arranging a "kriegspiel" on a couple of ordinary 6 inch maps and finishing the whole of the manœuvres in half an hour.

General Sir Beauchamps Walker, late Director of Military Education, in making some remarks last year at a lecture in the Royal United Service Institution, said that after 50 years service, the great fault he found with the officers of the British Army was that there was so large a *minority* who look upon the service as nothing but "skittles," and that he wished there was a little more earnestness as to the profession they had taken up. Now my experience is that nearly all officers are very keen indeed about their profession and are only too willing to study it, but as regards "*duties in the field*" have never been called upon to study these subjects until they suddenly find they have to pass an examination in them for their promotion. They naturally find a two months course of garrison instruction too short for all this, whereas, were it a part of the annual regimental training, every thing would be found simple.

The Germans gave up theoretical examinations on paper for promotion after the battle of Jena in 1806, but on the other hand set to work then on their present system, which is first to instruct an officer in the general principles of war or in what we call "duties in the field," and then to perfect him to teach others, under a due sense of his own responsibility; but this instruction has to be given by the officers themselves from the most senior downward.

The working of this system was described in a very telling manner by Col. Hale in a XIXth Century Magazine article some 4 or 5 years ago, pointing out that until about that time, our regulation system of military training of officers resembled that which the Germans had abandoned 80 years ago, and as an instance of instruction by senior officers quoted the case of a general of a German cavalry division utilising his own spare time in taking out a party of young officers and instructing them during a ten day's trip in reconnaissance and skeleton manoeuvres.

I sum up therefore by stating my belief, that if junior officers are given the opportunities of studying the intellectual branches of their profession whilst with their regiments or batteries, universal interest will be excited and the military knowledge of all ranks must increase and grow larger to the great benefit of the service.

I trust I have submitted for discussion a subject of general interest and importance and that you will treat my imperfect manner of dealing with it in a lenient manner.

The following Discussion took place after the paper had been read.

Colonel R. C. Hart. v. c., Director Military Education said :—

Captain MacDonnell has selected not only an interesting, but a very important subject for his lecture.

It is unfortunate that there is not a larger audience. However, through the medium of the Journal, the lecturer addresses a number of officers who will give due consideration to what he has said.

We all regret that the Commander-in-Chief is unable to be present. His Excellency has always taken the greatest personal interest in military education which so long "languished in the shade of official indifference." Sir Frederick Roberts and General Elles have given every support to the efforts which have been made to make the examinations of officers a thorough test of their practical qualifications for promotion.

As a nation we are not very serious about war. As an army we are rather indifferent on the subject of military education.

Many senior officers still regard instruction as merely the fad of certain well-meaning enthusiasts, while a good many of the juniors consider the examination merely in the light of an obstacle to promotion, to be overcome with the least possible inconvenience to themselves.

No one has yet been able to suggest a substitute for the examinations. We know they are far from being an infallible test, but they are necessary all the same, call them a necessary evil if you like.

Unless there is an examination, officers will not seriously study the professional subjects. Take for example military history, a subject which every officer should study throughout his military career. It is studied by a small minority. How very few of us have availed ourselves of such a priceless treasure in military literature as Napier's Peninsular War! Perhaps some of us erroneously imagine that nothing is to be learnt from the past.

We have no examination in military history, and if we had, it would do but little good if officers merely read up a few campaigns just before the examination.

How can we persuade all officers of their own free-will, to continuously study military history?

Napoleon, as a general, surpassed all mankind, his genius was superhuman, and yet he found it necessary to study military history, and urged his generals to do the same. His words were :—" Lisez et relisez les ouvrages militaires."

It is not uncommon to meet an officer who knows nothing of some famous battle which is emblazoned on the standard of the regiment. Surely this is very wrong and very discouraging?

We are sometimes told that the Germans have not our system of examinations, but we must bear in mind that the German military system is quite different from ours.

When a British general goes on service, it is probable that he does not take with him a single one of the corps which he has commanded in peace time, whereas the German general takes none but the troops he has trained during peace, consequently he has to look to the training and efficiency of his officers and men if he is to be successful and win honour and glory on the field of battle.

There is no spur like the spur of self-interest, and the German generals are personally more interested than the British generals, in the training and efficiency of their officers and men.

He who sows ease and comfort will never reap honour and glory.

Military instruction was introduced into our service some twenty years ago. The idea was not initiated in military circles, it was forced upon the army after the defeat of the French armies. The French officers, like our own, had not studied their profession, the German officers, on the contrary, had done so seriously for many years, and for their pains, they were regarded as simply dull, plodding, methodical warriors who must succumb to the onsaught of the more brilliant and dashing soldiers of France.

It must not be forgotten that a large majority in England expected nothing but defeat for the German armies, and we many of us can remember the confidence with which the French troops uttered their war cry "à Berlin,"—but for all that France came under the iron heel of the conqueror, and there was a panic in England.

A system of instruction was promptly introduced into our service but it met with strenuous opposition from the senior officers, the juniors naturally taking their cue from the seniors. It must be said, however, in justice to the senior officers of those days, that the early curriculum was most distasteful and ridiculously theoretical. Perhaps the synopsis had been drawn out by certain fossil professors who had had no practical experience of war.

Well; we have gone on improving upon the original course of instruction, and making progress, until the ordeal in this country has become thoroughly practical.

I quite agree with Captain MacDonnell, it is a pity that some commanding officers object to their officers attending the two months' course of garrison instruction, because it denies those officers the opportunity of greatly improving their knowledge of the professional subjects (*c*) and (*d*.) However, for an officer to attend a two months' course without previous serious study is in many cases to court failure. It is impossible in so short a time to acquire a sufficient knowledge of Tactics, Military Law, Topography, and Fortification. Indeed, one object in reducing the course to two months was to oblige officers to spread their studies over a considerable period before joining a class. The Instructors have very distinct orders to examine officers on their arrival, and if any officer does not possess a sufficient knowledge of the different subjects he is to be remanded to his corps.

The existing course of garrison instruction is excellent, but in these days, it is more or less an anomaly that officers should be taken away from their corps for instruction in "Duties in the Field." However, this outside instruction cannot be abolished until all commanding officers have accepted the responsibility of directing the instruction in much beyond the mere drill. The regiment should be the school of instruction, but even then, we must look to the generals to teach practically the tactics of the three arms combined. It will all come in time, but we are a long time about it.

It is not uncommon for a commanding officer to say that in these days with so many new duties and responsibilities, it is impossible to find time to direct the instruction of the junior officers, but there are those who do find time.

It is true that of late years, extra duty after extra duty has been piled on to regimental and staff officers alike, so much so that it has become absolutely necessary for an officer to devote himself body and soul to his profession or he cannot hope to get through the day's work with credit to himself. Perhaps no public servant so thoroughly earns his pay as the British officer.

It would be only just to grant some allowance to the officer, who in addition to his own duties would have to instruct the juniors in the elements of the various military subjects. The course at Sandhurst is so short that the cadets cannot learn very much before joining the service.

With regard to the assertion of want of time, it really reduces itself to a question of formulating a judicious programme of work, so as to make the most profitable use of the time available, and although a commanding officer cannot be everywhere, his personal influence should be felt everywhere and at all times.

Now a word regarding officers in civil employ—you may ask me how we would propose providing for their military training? It is no doubt very desirable for officers, to have varied experience, and to be thrown into responsible positions but the civil employment should be of very limited duration, otherwise there is a most dangerous and objectionable trifling with our military efficiency. We have, in this country, grown accustomed to seeing military officers in continuous civil employ, but should we not think it very ridiculous and subversive to the efficiency of the civil service if it were possible for their officers to neglect their legitimate work in favour of purely military employment?

Captain MacDonnell can hardly have overlooked that the Queen's Regulations provide for nearly all that is necessary, but these regulations are not strictly enforced—perhaps it is not yet possible to do so in consequence of the paucity of officers usually present at head-quarters.

Reference should be made to section VII. paras. 8, 9, 17, 205 and 206.

"8.—The commanding officer of a corps or depot is to take frequent opportunities of personally examining the officers, more particularly the subalterns, upon the following subjects:—Duties in the field, Military Law, the Queen's Regulations, * * * * * He will also cause them to be examined in the foregoing subjects periodically by the Majors.

9.—He will take advantage, of all opportunities for imparting to his officers practical instruction in outpost and other field duties, and in army signalling and will cause them to take part in such artillery and engineer exercises as can be carried out under paragraphs 205 and 206."

Paras. 205 and 206 refer to local instruction in artillery exercises, and in fieldworks.

If the regulations contained in section VII. were enforced, there would be no need for courses of garrison instruction.

In my opinion, next to actual war service, sport is the very best military training for seniors as well as juniors, sport of all kinds. Much might be said upon the advantages of sport, and it is to be regretted that in the confidential reports there is no place allotted for information regarding athletic proficiency.

With regard to the August examination, there was an unusually high percentage of failures, this has been due in great measure to the reduction of the course to two months, and to the fact that the Examiners have been instructed to eschew "book questions," they now assume that officers as a matter of course possess the necessary knowledge of the text books, and they go a step further and ascertain if the candidates can apply their knowledge.

Then again, the papers have purposely been made rather long, so as to develope an aptitude for promptly coming to a decision and rapidly expressing and giving effect to ideas. There is no occasion for any panic, the examiner makes full allowance for the fact that the candidates are not given undue time for deliberation, nor does he expect very elaborate and detailed answers in so short a time, and at the head of the papers on Tactics and Fortification is printed,

N. B.—When a candidate considers that in order to answer a question he requires more information regarding the military situation than is given by the examiner, he may make any reasonable assumption.

The examiner allows for very great diversity of opinion with regard to the solution of a problem.

Finally.—I think we may congratulate ourselves upon the efficiency of the army being of a higher standard than it has ever been before in our history. If officers are less experienced in war, they are neither physically nor professionally inferior to those who fought in the Peninsula and at Waterloo, while morally and educationally they are superior.

We should never consider that perfection has been reached, because it is impossible of attainment in these days of rapid progress, we must ever strive after a higher standard.

Increased efficiency means increased expenditure, and that must be faced by governments who often overlook the rapid increase in material prosperity.

I apologise for having trespassed so long upon the time and patience of an indulgent audience.

Colonel W. W. Biscoe, Commanding 19th Bengal Lancers, said :—"I agree with Colonel Hart in the remarks he has just made, and more especialy where he laid stress on the necessity of examinations being as practical as possible. With some diffidence in the presence of such high educational authorities, I would even venture to suggest that the present garrison course deals with a larger number of subjects than it can profitably teach in the short time allotted to it, and that one or two of them might be advantageously omitted. For instance, military his-cannot, in my opinion, be *crammed* to any good purpose.

To attain even a moderate proficiency in strategy, a long and thorough study of military history is required, and to give young officers a "period to get up," as the phrase is, comprising a single campaign perhaps, entails a great deal of labour without any adequate result. Again, Military Law, it seems to me, might well be left to be taught regimentally ; no very profound study of this subject is required of an officer in the ordinary course of his duties, nor any very skilled teaching, and he could easily learn all that is necessary with his regiment in the same way as he learns his Drill Book. In short, I think the scope of the garrison course should be limited to a thorough grounding in Tactics, Fortification, Military Drawing, and Surveying.

Major-General W. K. Elles said :—

The hour is so late that I must confine my remarks within the smallest possible compass and to one or two points only of this large question. In the first place I think we must all agree with the lecturer that there is much room for improvement in our system of regimental training. I am by no means an advocate for a blind following of German methods, simply because the Germans have been so successful in war ; but in the matter of training there is no doubt that the Germans are much in advance of us. Much as there is still to be done in the way of training with us, it must, however, be admitted that we have made some advance, and we must not be discouraged if the progress is slow. We are very conservative as a body, and transition from one system to another, or from no system to perfection, is slow. We may see an instance of this in musketry training. The school of musketry at Hythe was established in 1854, and immediately after the Crimean war the annual course was established in all regiments. The training was so unpopular, that in some cases the unfortunate subaltern, whose fortune it had been to be sent to Hythe and to be gazetted instructor, found the odium of musketry visited upon himself, and his position in the regiment by no means an enviable one. That state of affairs soon passed, but it was many years before the slightest interest was taken by the officers in the training, and any success was mainly due to the endeavours of the instructor, often in spite of the company officers. The advent of the stage of enthusiasm in musketry is so recent, as to be almost within the experience of the youngest present here to-day, and so complete is the change, that the wildest dreams of the very few enthusiasts of the early day, could not have pictured so great a transformation. Equally I suppose it appears impossible to officers now joining, that the state of affairs of the fifties could ever have existed in our army. We may put the period of transition in musketry at 30 years, and if we reckon a like period from the first beginnings of regimental training, or perhaps allow a little for the greater familiarity of the present generation with change and progress, we may still look forward to arriving at something like perfection within a reasonable time.

I would add one word of caution or rather advice. Let us be indulgent to the enthusiasts. Nothing is to be effected without enthusiasm, and we should rather lend ourselves to the *entraînement*, than offer even a passive resistance to a movement of whose necessity and benefit to the service we cannot but feel convinced. The training may be irksome; it may be foreign to our preconceived ideas, and it may interfere with some of our pleasures; but we may rest assured, that if our army is to maintain its place in efficiency with others, these small sacrifices must be made.

There are several small points referred to by the lecturer, on which I had something to say, but I must limit myself to one or two. First, the proposed abolition of close order drill. This is a large question, but it is one on which the enthusiasts, if I may call them so without in the least intending any disparagement, but quite the reverse, are making a mistake. Drill and manœuvre are both essential to training, and close order drill is not the least important part of the former. It is not only essential to ensure that absolute steadiness and instant obedience to command, which constitute the difference between an army and a mob, but it is also indispensable for several phases of manœuvre. Of the latter I need only instance night attacks. I would commend also to the advocates for abolition of close order drill, the story of the "Summer Night's Dream." This is avowedly an exaggeration, purposely put forward to provoke discussion, but it affords much food for thought, and recent discussions at home show that it has not been without effect, and that there is a considerable reactionary movement against the dispersed order of attack. Then again, the economy in spaces and intervals required in bringing large bodies of troops into line of battle cannot be neglected, and while out of fire the close formations may often be necessary. Formerly this formed a separate branch of military service, forming a third with strategy and tactics, and I almost think it is to be regretted that "*Logèstique*," as it was called, has been dropped as a separate study, although no doubt its principles have been incorporated with one or other of the remaining two branches.

Our limit of time has been exceeded, and I must close, but before doing so, I am sure you will join with me in a vote of thanks to Captain MacDonnell for having brought the subject before us in his interesting lecture.

THOUGHTS SUGGESTED BY "A SUMMER NIGHT'S DREAM."

By Major H. S. P. GRAVES, 26th Punjab Infantry.

The pamphlet, which has been translated by Captain Gardner, 1st Royal Lancashire Regiment, and published in the new United Service Magazine under the title given above, seems to me to be so interesting, that I have ventured to give a résumé of the principal arguments used to support the new formation for the infantry attack set forward in it, with a few of the thoughts which have been suggested to me by its perusal.

The idea is such an entirely new departure, that perhaps it requires the fact to be known that it emanates from a German officer, in order that its serious consideration may be ensured.

The discussion is between two German infantry officers who served in the Franco-Prussian war. Both are still serving in the German army, and consequently each knows that the other is conversant with the modern infantry attack and the principles which govern it. These may be summed up as follows:—

1st.—*With reference to the fire of the defence.*

The accuracy of the modern rifle necessitates the attacking infantry being formed with intervals between individuals laterally, so as to obtain the advantage of errors of direction.

It necessitates the density of the formation in which the advance is made being reduced as much as possible, so as to obtain the advantage of errors of elevation.

Advantage is to be taken of cover.

2nd.—*With reference to the fire of the attack.*

The greatest number of rifles possible, with due regard to the provision of supports and reserves, must be in the firing line.

A certain interval between individuals is necessary to prevent jostling, which would interfere with the taking of careful aim. The fire must be collective, *i e.* the regulated fire of a number of rifles against a named object, in obedience to the will of a single man, up to the shortest possible range. There must be perfect "fire discipline," which may be defined as the unhesitating habit, developed in the troops by instruction and training, of commencing, or ceasing, or relaxing the fire, or of concentrating it on a defined object, all in obedience to the deliberate will of the commander. The commander of each unit of the firing line must be able to superintend the firing of his men individually, and to make them hear his orders collectively.

Colonel v. Hallen argues, that in the present regulation for the attack, "We try to retain control over the troops and over their fire as long as possible, and at the same time recognise that the mixing of units and confusion are unavoidable: our desire for discipline and our love of dispersed order pull us in opposite directions."

v. Hallen offers two alternatives: the first is to allow the attack to be one of skirmishers, its success depending on the individual action of the men. The second is to attack with units of a certain strength, working under the orders invariably of their leaders in close, not extended, order.

He states, that practically the dispersed fight has been given up, but that any one pleading for the introduction of firing lines in close order must expect to be considered unsound in his views.

The formation he recommends for the firing line is that of züge in single rank and close order, the men to fire lying down.

The extended order which was created during the wars of the French republic and the first empire, and adopted by the Prussians, has ceased to exist. The men in extended order only prepared the fight, but did not carry it out. "Either the fire of lines or the bayonet charge of columns decided the battle". A small portion of the infantry detailed for the attack extended to cover the movement of the main body. They conformed to its movements, and when the time came for the assault they closed on it. "The modern fighting line unites in itself the old preparatory fire of the skirmishers and the decisive massed fire of the line. It even takes the place of a portion of the shock power of the old columns. It has passed from dependence to command. This decisive, all grasping force, dictates the movements of the reserves. These latter are now no more than reinforcements for the fighting line. Their real work only consists in moving up sooner or later into it. The present "extended order" demands, not only portions of the infantry, not merely specially instructed men, but the entire infantry. Formerly, when extension began, by far the larger portion of the troops were retained in close order. In this way the certainty of having an united and concentrated force for the decisive moment was preserved............The extension was always only for a fixed time, and had a fixed object. As necessity arose, the skirmishers were withdrawn and absorbed into the main body in close order............There is now only the extended order, which increases in volume up to the end of the fight."

"One advantage (of the old extended order) was that the enemy had only a few men to fire at. The present thick firing lines give masses to aim at. The second advantage was that each man's shots could be better delivered. Fire was then at short distances, at 100 to 150 paces; the marksman could chose the proper moment for each shot."

"It was necessary to allow the skirmisher a free hand in firing, otherwise the best chances would be lost. It was then quite right, that he should select the best cover, and so creep up to the enemy. The only limit to his freedom was the rule, that he was not to interfere with the fire of others. The skirmisher was then a really independent warrior. To-day the fire begins at 600 yards, or at even greater distances. The skirmisher sees nothing more of the enemy than a line of little clouds of smoke. He can only aim at the mass of the enemy, and to obtain good results, collective not individual fire is necessary...........

Again, it often happens that in calm weather the smoke completely envelopes a thick firing line. When that occurs what becomes of the special advantage of extended order, in the more convenient delivery of each separate shot?...........The advantages presented by the original dispersed order have been lost; the only point which the present extended order has in common with its predecessor is its irregularity. Formerly we had the irregular order for individuals, and there was a reason for its existence, in its association with the main body in close order; but now we have the irregular order for masses, a thing for which there never has been any justification since disciplined troops first existed."

v. Hallen gives his experience of the difficulty of maintaining fire discipline in the din of the firing line, especially when it consists of men of different regiments, but states his opinion that a permanent fire control is possible under certain conditions namely.—"The firing line to consist of züge in single rank, the strength of the zug not being greater than 50 men. The zug must be taught always to close to the centre, so as to make mixing impossible...........Finally, when a leader falls, his place must be instantly taken by a successor."

"In reconnaissance, on outpost duty, in skirmishes between small bodies of troops, in close or wooded country, the real dispersed fight will still occur. But on the drill ground, or at manœuvres where the fight is practised, not of patrols, or of companies, but of large bodies of troops, there should be nothing heard of individual independence and of individual fighting."

This close order formation is the only remedy for the evil of skulking, which the present formation of masses in extended order encourages. "The private must have some sense of duty and some courage,—yes he must possess even heroic steadfastness, not to follow the tempting example of others, to withstand the charm which every tree, every furrow, every ditch has for him, when he knows he can gain security without risk of punishment ....When fighting in close order with his own comrades and his own leaders, the soldier will keep his place in the hour of danger without being a hero. Here the weak are supported by the strong; here the power of discipline, the influence of the strict drills in peace time, and the authority of the leader prevail. In dispersion it is difficult to be steadfast; in close order it is difficult to be weak. Under the leader's influence, the example of the strong impels the whole: among the leaderless the example of the confused and the cowards has the upper hand"

As to the losses from the enemy's fire in the formation he recommends, he remarks—"1st. Züge in close order and single rank really offer no better target than clouds of skirmishers. 2nd. That formation will lose least in a fight, which can do most injury to the enemy. 3rd. An army which either suffers from, or is not quite recovered from the malady of fearing losses, must wage no war, for war is pitiless, and regards not the life of man."

"By close order I do not mean any rigid adherence to the letter of the word............My close order will open the ranks when necessary, but close them again when the necessity is passed. The temporary opening of the ranks is not the dispersed fight. If troops, who know no other style of fighting than close order, come under fire while the ranks are opened, as soon as the ground allows of it they will strive to again form single rank sections in close order; and this is exactly what I want. It is precisely in cramped country that you most need cohesion and dash, since here all the advantages are on the side of the determined attack. Nowhere is extended order, when constantly maintained, more unsuitable and dangerous than in such country."

"The task of future fire tactics will be to unite the old close order and strict fire discipline with the modern art of utilizing cover. The parts played by villages and woods in the fight will then be reduced to their proper dimensions..............Villages always give good cover for the movements of troops..............In the attack on a village, care should be taken, after driving the enemy out of the out-skirts, to concentrate all available forces on its flanks, and so bring about its fall ....With respect to woods: they must cease to be "filters into which entire brigades are poured," and dropped out in little driblets on the other side. The unfortunate experience of the last war has caused the fact to be generally recognised, that men must be kept together in woods, and if the enemy be met there, he must be charged at all costs...... Even in the most open woods, except in roads and glades, you can seldom see farther than about a hundred yards. The encounters take place, therefore, at murderously close distances: all depends here on being first to attack, using magazine volleys and the bayonet. This is the proper place for united action. Therefore do not advance in dispersed order, but in single rank züge in close order, opening files from time to time. The attack must often place a particular value on woods, as giving the means of approaching the enemy's position under cover. If woods are not to play the mischievous rôle of filters, we must understand the art of leading, with all due precautions, large bodies of troops in close order through any description of wood, and of deploying them under cover at the further edge without difficulty. Then at the required moment they can move out united, and commence the attack with a closed front. Such skill can only be acquired by much practice. It will be a new force added to the fight in close order............"

"In mountains my single rank züge will be able to go wherever the modern cloud of skirmishers can. Where, however, only individuals can move, any fight must necessarily be a sort of outpost skirmish, and the education required for this work can only be learnt in the field and on the ranges, not on the drill ground. Such fighting, being a series of duels, calls for an independence quite different from that of each man in a crowd fighting on his own account The latter style is hurtful, and to be avoided: the former is a very high form of training, which we should seek to attain."

From the description of the battle which was the dream of the other officer, we see that the regimental formation for attack proposed by Col. v. Hallen is as follows:—

The 1st and 2nd battalions form the first line, the 3rd battalion the second line.

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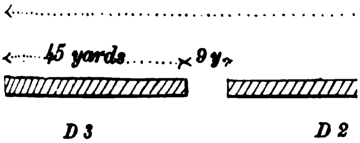

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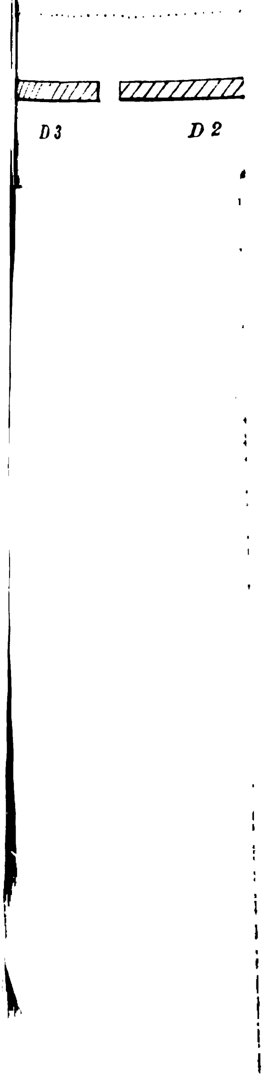

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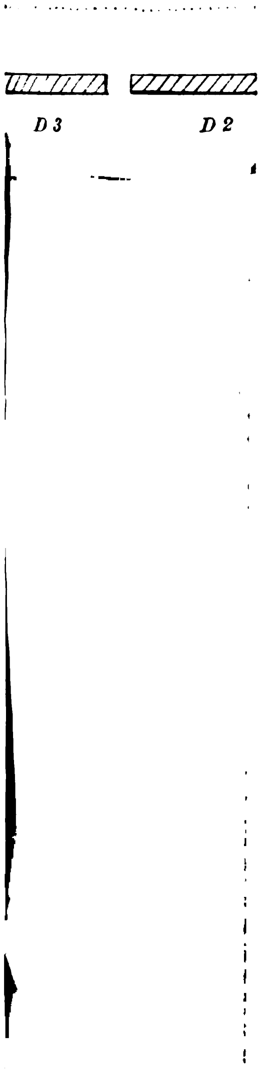

The companies in each battalion are told off into four züge, each under a zug-leader, with a second leader told off to take the place of the first leader, if necessary.

Each zug is divided into half-züge, and each half-zug into three sections, each of which has a first and second leader, and a private told off to replace the latter.

One section leader is also told off to replace the second zug-leader, if killed or wounded.

Thus in each company, before the advance begins, sufficient zug and section leaders are told off to meet all probable casualties.

Two companies of each battalion form the firing line and supports, two the reserve.

The inner company of each battalion has three züge in the firing line, and one in support; the outer company has two züge in the firing line, and two in support.

General Rules.

The object of the attack, and the part assigned to each portion of the troops engaged, will be explained as thoroughly as possible.

The distance between the firing line and the supports, and between the supports and the reserve, will be about 300 yards ordinarily, but will be decreased as opportunities offer.

The interval between battalions in the firing line will be twenty-five yards; between züge nine yards, until fire is opened at about 700 yards from the position; from that to the final stage of the attack, four yards.

Each zug will march by its centre, *i. e.* the right hand man of the left half-zug. The section leader of the fourth section will march in front of the zug and give the direction; the second section leader of the fourth section will march behind the right flank of the left half-zug and direct it. The other section leaders will be in rear of their sections, and will be responsible for the maintenance of close order and discipline.

The advance under fire will be by rushes of about 50 yards, and will begin and end on the command of the zug-leader. The men of a zug will be ordered to rise and to advance, closing on the centre on the march, and will be halted and dressed before the command to lie down is given. The advance of one zug of a company will be followed as soon as possible by that of the remaining züge.

Firing will only take place by the command of the zug leader. It will be as long as possible in volleys, and they will be given in the lying down position, unless the men have to stand or kneel in order to see the enemy. On the sound of the whistle, which will be carried by all leaders, firing will cease. Should the volleys become irregular, firing will be stopped till the men become steady. During an advance by a zug, the men in the züge on each side of it, unless clear of it by 25 yards, will cease firing, half cock their rifles, and bring them to an upright position, and will not be ordered to fire until the züge to which they belong have advanced to the spot at which the first zug has been halted.

Magazine, or independent firing, will not be used, except on special occasions, until the pause before the final charge with the bayonet. It will commence on the command of the zug leader, and will cease on the sound of his whistle.

Reinforcement of the firing line by the supports or the reserves will be carried out by züge. As a rule the züge in the firing line will be reinforced by the züge of the same company in support; but when these have been used up, if a zug from the reserve reinforces the firing line between two züge of a company, it will act as part of that company; if it reinforces between two züge of different companies, it will act independently.

The reinforcing zug will form rank entire, if not already in that formation, by the rear rank men moving up on the left of their front rank men. When it arrives at about 130 yards from the firing line, its leaders will blow their whistles to warn the firing line. The whistling will be taken up by the leaders in the portion of the firing line to be reinforced, and orders will be given for more rapid volleys till the reinforcing zug arrives. When this is about 30 yards from the firing line, its leaders will again blow their whistles, and the firing in the züge within 25 yards on each side of the gap, to fill which the reinforcement has been sent, will be stopped, the rifles placed at half cock and muzzles upright, if the men are kneeling or lying down, the rifles sloped if the men are standing. The reinforcing zug will double through the gap, and be halted, dressed, and the men ordered to lie down, when it has gone about 50 yards to the front of the firing line.

The control of the men in each zug will be in the hands of the zug leader, the section leaders being responsible for seeing that his orders are carried out by the men of their sections.

In each battalion, one subaltern officer as closing officer, one serjeant, and eight lance-corporals will be selected for the "battle police", for the duty of preserving military order on the battle field. The senior closing officer will be the regimental closing officer, and will have control over all the battle police in the regiment. The duties of the battle police will be to follow the firing line, direct the wounded to the dressing station, and assist the surgeon and the stretcher bearers to find severely wounded men; to bring any men found unwounded in rear of their züge in the fighting line to the adjutant of the battalion reserve. The reserve ammunition will be in charge of the company ammunition carriers.

From this stage on the dream battle becomes, as is perhaps natural, rather confused. The reserve of each battalion changes from two companies to three; after the last züge from the supports have reinforced the firing line, the casualties in it become so numerous that a gap is left in the centre of the firing line of each battalion sufficient for one company, or four züge, yet only two are sent forward, and so on. But it explains sufficiently the working of the new formation. I have calculated that, up to the final stage, when magazine firing is ordered, preparatory to the charge, 50 per cent of the men in the fighting line have been put out of action: certainly under such losses the attack in extended order must have failed.

It would appear from this pamphlet, that the conviction has been forced on at least one German soldier, that the fire discipline requisite for the efficient conduct of an attack by infantry in our day, cannot be maintained in the extended formation which has hitherto been considered the only one possible under rifle fire; that extended order encourages the natural tendency to avoid danger and leads to the abuse of cover; that although, theoretically, in extended order the men are still under control and not acting individually, the qualities required both in the men and their leaders to enable them to carry out their parts in the general attack, are of such a high order, that, practically, under fire all control ceases. Therefore the present extended order in which individuals move with intervals between them must be given up, and in its place a formation must be introduced, which will offer the least vulnerable target to the enemy, compatible with complete control over the men, which alone will ensure their combined action; and the extension by single ranks in close order is claimed to meet the requirements of the case.

Before discussing the advantages and disadvantages of the proposed formation, as compared with those of the present one, we must consider the conditions of the fight. The attacking force must reach the position with sufficient numbers to overpower the defenders; and to do this, it has during the advance to pour in a fire which will materially lessen the destructive effects of that of the enemy. If it cannot do this, the attack fails. Loss during the advance is inevitable, but the amount of the loss will depend on the accuracy of the enemy's fire, and this will depend on the target offered by the formation in which the advance is made, and the steadiness of the defenders under the fire of the attack.

Now first, as to the vulnerability of the target offered by the extension by single ranks in close order.

The formation ensures the depth of the firing line being that of one man, thus giving to the attack the advantage of all errors of elevation made by the defence; and errors of elevation are the more common, as they depend on the accuracy with which the distance of the object fired at is estimated, and on the careful adjustment of the back sight of the rifle. This is aimed at in our present extended order, but can it be carried out except on the parade ground? Can men be trained to avail themselves of any cover that may offer in their direct line of advance, but not to diverge to a flank to obtain it? And granting that advantage is only taken of cover in the direct line of advance, will not others of the section besides those immediately in rear of it, crowd in to take advantage of it also? Sooner or later the advance must cease to be one in single rank. Sufficient cover can be obtained by simply lying down, and the proposed formation allows this by word of command.

Again, the longer the advancing troops are under fire, the more they will suffer. I think there can be no doubt, that men in close order, that is, in the formation in which all movements on the parade ground are performed, will rise up and advance together in a shorter time than the scattered groups of the present order. The advance now is by sections, but if the men nearest to him rise on the section commander's order, there must be some delay while the men who have taken advantage of cover are being got out of it.

Second, as to the effect of the fire of the advancing troops on the defence.

It is generally agreed, that the fire of the advance must be collective, and that this is best carried out by means of volleys fired by word of command. A volley, to be effective, must be regular, that is, all the rifles must be fired at the same time and they must be aimed at the same object. To fire regular and effective volleys, requires that the men be cool and collected, and that the word of command be distinctly heard by them. Now is it possible to obtain the conditions necessary for an effective volley from, say 20 men, who are extended, or rather scattered, over some 40 yards of ground, in the din of a battle? The volley must be extremely irregular, even if all the men fire at the same object, and thus the effect of a number of bullets striking at the same moment is lost; it is almost impossible moreover to correct this irregularity in extended order, while in close order the commander of the section can see that all the rifles have been brought to the shoulder before he gives the word "fire."

In extended order, the supervision of the captain over his company as a whole may be said to virtually cease, when the men once get under fire. He cannot tell when one section ends and the other begins, and is unable to see if the leaders are doing their work. In the proposed formation, as the sections always close on the centre as casualties occur, the intervals between them must remain distinct.

It is a question, whether any considerable loss is effected by the fire of the infantry while advancing,—whether the shaking of the defence through casualties is not entirely done by either artillery or auxiliary bodies of stationary infantry,—and whether the effect produced by the advancing infantry does not depend on the determination it shows to come to close quarters; but, I think that when the object aimed at is so ill defined as a position from which men are firing, and which is therefore more or less obscured by smoke, greater loss will be inflicted by volleys from men in close order, and therefore under the control of their leaders, than from the irregular fire of men in extended order. Firing while advancing keeps up the spirits of the men, but the fire must be of secondary importance to the advance. I venture to think that our regulations tend to discourage a determined advance. "When the firing line approaches so close to the enemy's position, that the advance cannot be continued without unnecessary exposure, independent firing will be ordered." This point in some men's minds may be situated a very long way off. Again, the annihilating effect of modern rifle fire is dwelt upon, and St. Privat is instanced. No paper by an English officer would be complete, were not the attack on St. Privat dragged in somewhere. But was not the loss to the Guard Corps caused by their advance in deep formations? The rifle in the hands of men in position, who can use it under the conditions which obtain on the range, or even at field firing, should be annihilating; but these conditions do not obtain in a battle. The effect of the fire of our troops in Afghanistan, in Zulu Land, and in the Soudan, has been in many instances by no means annihilating. The explanation has been, that the men lost their heads, that there was no fire discipline: but if men start on a campaign with the idea that exposure to the enemy's fire means annihilation, they will lose their heads, and rush to the nearest cover, from which it will be hard to make them advance, as soon as that fire is opened on them. A campaign is the only school, in which fire discipline can be effectually taught: after a man has heard bullets whistle past him, he comes to understand that the chances are against his being hit, and he will be able to keep cool. But there will always be a large number of men who will lose their heads, not from the fear of death, but from the noise and excitement of the battle. In extended order such a man would surely prevent fire discipline in the section of which he forms a part, but if in close order, the accustomed touch of the man on each side of him would tend to allay his excitement, and on a word or two from them he would pull himself together. Prince Kraft thinks, not only that the German infantry is the most perfect infantry which has yet been seen, but also that no more perfect infantry can be imagined. There will be danger for England when English officers agree with him, but his opinion must naturally be that of every German officer. Yet in the pamphlet under discussion, we are given instances of the most perfect infantry in the world losing head and heart completely. The British infantry in the Peninsula had splendid fire discipline, but the men were war-tried veterans; at Waterloo the British infantry was as steady as ever, though there were many in the ranks who were boys. There is a mighty power in the feel of the "light touch of the elbow." It is an easy thing to teach men of very ordinary intelligence, that they must not leave the ranks without orders, but when, having separated them from their comrades, and called for the exercise of their individual intelligence, you expect them to act in the excitement caused by firing and being fired at with any approach to the machine-like regularity you have seen with the same men on parade, you are expecting too much from them. But so much at least is required for the attack in extended order.

In this pamphlet great stress is laid on the aid given by the leaders' whistles. We have introduced whistles, but I should like to see an order issued, that they must be used on all occasions when firing takes place. I think that, if on the range the whistle were always blown, when it was necessary to cease firing, the men would soon learn to act at once on its sound, though of course the bugle for warning the markers could not be dispensed with.

TARGETS AND MARKING.

By Captain du Moulin, Royal Sussex Regiment.

The following extracts are taken from a pamphlet* describing a new system of working targets on the range:—

The following points are essential in any system of targets for rifle shooting:—

1. Perfect safety of markers.
2. Absolute accuracy of marking.
3. Impossibility of fraud.
4. Great rapidity of marking.
5. Adaptability to any station.
6. Perfect means of checking targets.
7. Economy of construction.
8. Economy of lead.

An arrangement of double trollies, the details of construction of which will be shown further on, combines in itself the whole of the essential points which are required to be considered.

It consists of targets with wooden frames fitting into trollies of a peculiar shape, moving on telegraph wires stretched very tightly between posts. The small iron wheels of the trollies are fitted in such a manner that is impossible for the targets to blow over.

The whole apparatus works so lightly that the trolly, even with a first class target in it, may be pulled in and out by a child.

For each section double targets are used on separate lines of wire, and by this means a saving of between 30 and 40 per cent. of time is gained; one target being inside the butt while the other is outside to be fired at, their places being changed rapidly as soon as the shot reaches the butts.

At the short ranges, using four sections, from 30 to 40 men may be fired, ten rounds each, in an hour; these numbers decreasing slightly as the ranges increase until, at 800 yards, between 20 and 30 men may be fired in the hour.

The cost of this system is less than that of any other, and, in order to render fraud impossible, certain procedure is adopted with regard to the register keepers, checking of targets, etc., which, when combined with the rapid and accurate marking, render this system as nearly perfect as may be.

Procedure at the Firing Point.

Two men at a time fire on each section alternately, the order of firing of the whole squad being shown on the register by small numbers opposite each man's name.

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* Targets and Marking, 29 plates, one rupee. Lahore, *Civil and Military Gazette* Press.

Immediately the first shot is fired, the target is pulled in and another appears at which the other man fires. As soon as his shot reaches the butt, his target goes in and the first man's target comes out with a spotting disc inserted in the bullet hole. The shot is also signalled in the usual way, the register keeper sees that it agrees with the spotting disc and calls out its value, the man adjusts his sights and fires again.

This procedure is then gone through again for the other firer, and so on, each man putting his shots on his own target, and having the position of his last shot shown him, and always visible, by the spotting disc.

Thus, there is always "a shot to come out," *i. e.*, the target containing the last man's shot is inside the butt. When the squad has finished firing, it will be found that the last shot fired has not been signalled, but, when the *Cease Fire* is sounded, this shot is signalled by the markers in the usual way.

The registers are kept by Non-Commissioned Officers of a different company to that firing.

After the *Commence Fire* has sounded and the markers gone into the butts, the sections, as well as the register keepers, should be changed to different firing points. It is thus impossible for any Non-Commissioned Officer or man in the butts to know on which target any particular section, or individual, may be firing.

The officer in charge of the firing point should *personally* order the change of sections and register keepers, and should himself give orders as to what men are to commence.

It is never necessary for the firing to be stopped until the whole section has finished, as, unless for relief of markers or some unforeseen occurrence, the danger flag is never put up at the butts.

Procedure at the Butts.

The targets are never shown outside the butts until *Commence Fire* has sounded and all is ready for firing. Thus, the fact of the targets being visible signifies that all is clear in the markers' butts.

The men required in each markers' butt are a Non-Commissioned Officer, a man pasting out hits, a man signalling hits, and one man working each trolly.

Immediately a shot is fired the target is run in, and the other target run out; the spotting disc is inserted in the bullet hole and the men wait for the next shot.

When that comes, the targets are run in and out respectively whether the shot is a hit or a miss. The marker then signals the first shot with the signalling disc, directly on to the target, calling out at the same time the value of the shot, which is entered by the Non-Commissioned Officer on his butt memorandum. In the meantime the man pasting out hits has inserted the spotting disc into the bullet hole on the inner target.

When the outer target comes in again it will be found to have *two* bullet holes it it, *viz.*, one with a spotting disc in it, and a new one. The man pasting out hits then changes the spotting disc to the new hole and pastes out the old one.

It will be perceived that the Non-Commissioned Officer does not enter the shot in his memorandum until it is called out by the marker. This is done to save confusion, and he can easily see, if the marker says "centre," whether the spotting disc is in the centre ring, and whether the marker signals a centre.

Under this arrangement of targets it is never necessary for the markers to go outside their butts, during the whole time that men are on the range. The safest way to prevent an accident is, *never to allow the targets outside the butt until ready to be fired at.* The markers are thus prevented from idling about in front of the targets, a practice which should be strictly prohibited.

The Butt Memorandum.

When this system of targets and marking was introduced, the old form of butt memorandum was in use, but was improved by the addition, on the back, of a printed form on which the shots were recorded in the rotation in which fired.

This form has now been adopted in the new butt memorandum, Army Form 141, introduced by G. O. C. C. 18th January 1890.

The shots can thus be checked, one by one, with those entered on the register, and if there are any points to add or deduct, the very shot where the mistake occurred can be traced. Thus, if there is one point to add, it will be found that a certain shot is entered on the butt memorandum as 3 (or 4) but on the register as 2 (or 3). In these cases the mistake lies always with the register keeper, who has not properly seen the signalling. Every register keeper should have a pair of field glasses, in order that he may check the signalling with the position of the spotting disc.

Fig. 1.

This plan shows the position of the wires with respect to the markers' butts and stop butt. There are three lines of wires, protected by a ramp in front, two lines being for targets and the third for the moving target. The target lines extend only just far enough outside each markers' butt to give space for the target which is fired at, but the moving target line extends right across the range.

The gauge of each line is two feet and there is a space between each target line of one foot.

The small shaded squares represent two small markers' butts, 4′ × 4′ × 5′, which are used when the moving target is being fired at.

Fig. 2.

This plan of No. 1, or the right-hand section, shows on a larger scale the position of the three lines of wires, the position of the targets and of the markers.

The left hand, or No. 4 section, corresponds in every way.

Positions of Markers.

a Man signalling shots.
b Non-Commissioned Officer keeping memo.
c & d Men working trollies.
e Man pasting out hits.
f Man working moving target.

Fig. 3.

The centre butt gives cover to two sections, and this plan shows the position of the targets and markers. The measurements of the centre butt are shown further on.

Fig. 4.

This section shows the manner of fitting each line of wires.

Posts are sunk into the ground as above, at the extremity of each line, and must be very firmly packed with concrete, well rammed. The concrete may be composed of broken bricks, lime and sand, and the wooden posts must be well tarred before being put in the ground, to protect them from the ravages of white ants, the wires not being fitted in until the concrete has thoroughly set.

The wires are supported about three feet from the ends of the line, by pieces of timber, adjusted, as to height, by bricks and notched on the top to receive the wires, similarly to the "bridge" on a violin.

These pieces of timber can be closed inwards to each other or moved outwards, but the distance between them should be only just sufficient for the trolly to run in and out.

Method of fitting Wires.

The posts, which are sunk in the ground bedded in concrete (Fig. 5) project about twelve inches, and across them is laid a length of old railway rail with holes bored at intervals of two feet and one foot, for the wires.

Fig. 6.

This plan shows the relative positions of the rails to which the wires are fixed and the posts which support them.

It will be observed that the wires in the centre of the range are not continuous, but those on one side are about two inches out of the straight line. This is necessary in order that the wires, both on the right and left, may be tightened independently.

Each set of wires is separate from any other, and thus, if by chance a wire breaks, only one target out of the eight in use will be thrown out of gear. A new length of wire can be inserted in five minutes.

The wires will not break except by

a Men stepping on them.
b Twisting when being tightened.
c Kinking when being unrolled from the coil.

Fastening the Wire to the Rails.

In fastening the wires to the rails *outside* the markers' butts, the wire is first passed through the hole in the rail, which has been bored to receive it (Fig 5), twisted twice round a small piece of rod iron, which acts as a "toggle," and the end brought back again through the hole. This will never become loose, and a new wire can be easily fitted when required.

For fitting the wires to the rails *inside* the markers' butts, a peculiar shaped bolt and nut is used, which passes through the hole in the iron rail and to the end of which the wire is fastened, By this means the wires can be tightened at any time by screwing up the nut.

Figs. 7, 8, 9.

This bolt is of a peculiar pattern and must be made of the best Swedish iron. It is straight, 12 inches long, $\frac{3}{4}$ inch thick, with a thread of 8 inches, and a nut which must be well made and fit the thread perfectly.

Two holes are made in the head of the bolt, one just large enough to allow of the wire being passed through, and the other, at a distance of one inch, of a size to admit the point of a steel punch which is inserted and held firmly while the wires are being tightened, in order to prevent them twisting.

When fitting the wire to the end of the bolt, it is first passed through the hole made for it and then twisted once round the bolt, in such a way as to cause a "jam," which will never loosen (see Fig. 8.)

The bolt must never be allowed to turn round whilst the nut is being screwed up and the steel punch must be held steadily to prevent it.

The Wire.

The wire must be new telegraph wire and can be obtained from the Telegraph Department, if certified for "use on range."

The cost varies; 600 lbs. to the mile wire costs about Rs. 3 for one hundred yards, but there are several sizes of wire, the most convenient being about $\frac{3}{16}$ inch in diameter, which weighs 600 lbs. to the mile.

To estimate the quantity required, take five times the width of the range. This will give a double line of targets, and a line for moving target, and will leave sufficient over to keep some lengths in reserve.

When using the trollys the wires must be very taut, as tight as banjo strings.

The length of "run" for each trolly depends on local circumstances, but the target should not be further outside the markers' butt than is absolutely necessary. At third class distances the target may be closer than at first class distances, but a great deal depends on the shape of the markers' butt.

Moving Target, or Running Man.

If a moving target line is required, it can be fitted up to run behind the other targets, at the small additional cost of Rs. 28 4-0 for four targets to move together.

In order that four targets may be used at once, two small markers' butts are constructed as shown in Fig. 1 sufficiently large to accommodate one man each for signalling purposes.

These small butts are four feet square and five feet high in front, the walls being built of kutcha brick, two feet thick at the sides, and three feet at the back. The roof is constructed of timber, with one foot of kutcha brick and one foot of earth on top.

The Trolly.

Figs. 10, 11, 12, 13.

The trolly is of very simple construction, but should be made of sound, seasoned timber. It consists of a plank seven feet in length, one foot wide, and an inch thick bolted on to two cross pieces. The plank is fitted with three slots, into which the legs of the targets are placed and a loop of wire at each end, which is used when pulling the trolly in and out. The slots are at intervals between *a* and *b* of 4 feet, and between *a* and *c*, of 6 feet.

Into these latter, the 2nd class and 1st class targets both fit.

The slots into which the legs of the targets are placed, are fitted with an iron plate screwed to the top to prevent wear. Care should be taken that the legs of the targets are of a size to slip easily into the slots.

The cross piece must be made of teak or other hard wood. It is 2′ 6″ long, 3″ wide, and 1″ thick, and to the ends of it are screwed the arrangements for carrying the wheels. (See Fig. 11.)

Two pieces of hard wood of a triangular shape are fitted to the cross piece, leaving only just enough room, between them, for the wheels to move easily. The axle of the upper wheel is short and is inserted only 1″ into the wood blocks, but that of the lower wheel projects right through. (See Fig. 12.)

It is simply a bolt and nut, of the same diameter as the centre of the wheel. This nut is necessary, as the bottom wheels have to be removed in order to allow the trolly to be placed on the wires, after which they are replaced.

The principle of the two wheels is shown on Fig. 13. The wheels are the small iron ones, 2″ × ½″, which are used on railways to support the signal wires, and cost in the bazar about 4 annas each.

Brass wheels are absolutely useless, as they wear out in a few days.

It will be seen that the wire passes between the wheels, which are close together, and as it thus has a wheel both above and below it, the trolly cannot be taken off the wires without first removing the bottom wheels.

Thus it is *impossible* for the target or trolly to blow over.

FIG. 14.

This plan shows the method of fitting the targets into the trollies. Underneath the trolly triangular blocks of wood are screwed, one on each side of each slot. The legs of the targets are also fitted with similar blocks of wood, which keep the targets at the proper height above the trolly, whilst the blocks underneath keep the targets upright.

Working the Trolly.

The trolly is fitted with a loop of wire at each end, clenched underneath. The man who is working the targets carries a bamboo pole, two inches from the butt end of which is fixed a hook like a boat hook.

With the butt end of the bamboo the trolly is pushed out to the proper place, and it is pulled in again by the hook inserted in the loop of wire, see Fig. 10.

Rope constantly breaks and is not nearly so easily worked as this boat hook.

Trolly for Moving Target.

This trolly is in every way exactly the same as a large trolly, with the exception that it is only three feet long, and that it is fitted with two small slots to take the legs of the target.

When using the running man line, the four targets are connected together by a rope, and pulled to and fro by a man in each markers' butt on the right and left of the range. The small butts, shaded in the plan, are used for signalling the hits, the length of "run" of the trollies being from one butt to another. Thus the four targets are exposed together, and under cover together.

Targets.

The targets consist of a wooden framework covered with dasootie. The wood must be of the very best quality, thoroughly seasoned, and free from knots or cracks. Some soft wood, easily penetrated, like deodar, is the best. If made of good timber, these targets last for a very long time, as the Martini Henry bullet makes only a small hole, but it will be found that more targets are broken by the rough handling of the markers than by the shooting.

Third Class Target.

FIG. 15.

Frame; battens of deodar or other soft wood, free from knots, $\frac{3}{4}''$ thick, 3″ wide, cross pieces at corners. Legs of target, 7′ long fitted with triangular wood blocks front and back, leaving 7″ clear to fit into trolly, cost, each, Rs. 1-12-0,

At the corners, the battens are not halved out, which weakens them, but are nailed, one on top of the other, with 2″ wire nails clenched at the back.

Second Class Target.

Frame; battens as for third class target, but 1″ thick and 4″ wide. Cost Rs. 2-8-0.

The cross pieces at the back are longer, and further from the corners, but in all other respects the target should be made as described in foregoing para.

First Class Target.

FIG. 16.

Frame; battens as for third and second class targets, but 1″ thick and 5″ wide. The pattern of this target is somewhat different from the others, the legs of the target being six feet apart, as in the plan, so as to enable the target to fit into the trolly.

Targets made after this pattern are strong and last well, as the weight is better distributed, but after they have been some time in use the cross pieces may be added, although they are not necessary until the targets need strengthening.

The cost of a first-class target, after this pattern, is Rs. 3-8-0.

Covering Targets.

Condemned tents make excellent dasootie for covering targets, and can be obtained from the various arsenals. It should be tacked on to the frames, so as to leave a margin of wood of about an inch wide, all round the target.

When covering targets a better plan is to carry the canvas round the edge and tack it at the back; this prevents the paper splitting when it dries.

For covering the canvas, old newspapers can be got at small cost from any newspaper office. The *Civil and Military Gazette* and *Pioneer* are excellent, being of a convenient size and of good quality. The *Englishman* and other papers of that size are too large and too thin.

Pasting out Hits.

For practice, hits may be pasted out on the *face* of the target, but for the annual course, or for match-firing, they must be pasted out on the *back* of the target, so that the shot holes may be checked on the face, by the Officer or Non-Commissioned Officer.

The best paper for covering up hits on the back of the target is the brown wrapper outside each packet of ammunition. This absorbs paste readily and dries quickly, but is of course of too dark a colour to be used for the front of the target.

Spotting Discs.

The spotting discs which require hooks or brass clips are expensive, and troublesome to work. The one which is shown in Fig. 17 is much more simple and economic.

It consists of a circular piece of tin, black on one side and white on the other, fitted to a wooden pin. This pin is turned to a certain size out of a piece of cedar, and can be used to show any hit on a target.

The tin disc fits into a notch in the centre of the pin, the pin being slightly larger at the points marked A than the diameter of the bullet hole. This effectually prevents its falling out of the bullet hole.

The hole in the centre of the disc is cut by a punch the exact size required to fit the centre of the pin; the four cuts are to enable the disc to slip over the thick part of the pin.

Moving Target Figures.

In place of having a wire frame the shape of the figure, which soon becomes shot to pieces, it is simpler to make a miniature target, similar in every way to a third-class target, but only just large enough to take the sheet of paper on which the figure in lithographed.

This miniature target should be of the following dimensions:—height 2 feet 6 inches; width 1 foot 8 inches; made with legs and wood blocks exactly like a large target, but the battens need be only $\frac{3}{4}''$ thick and $2\frac{1}{2}''$ to $3''$ wide.

The sheets upon which the figure is lithographed can be procured from the *Simla Fancy Repository*, and need only to be pasted on the target.

Register Keepers.

The following procedure is adopted at the Firing Point in order to ensure accurate and rapid signalling and scoring.

Two men at a time fire alternately, the order of firing being shown by numbers in some convenient place on the register.

Immediately the first shot is fired, the target is pulled in and another one run out.

This the other man fires at, and then *his* target is pulled in and the first target run out again, with a spotting disc inserted in the bullet hole. The shot is signalled in the usual way, and the man fires again. Thus each man puts all his shots on his own target.

Register keepers must remember that there is always a "shot to come out," and that the target containing the last man's shot is in the butt.

They must also bear in mind that when the *Cease fire* sounds all targets are drawn into the butt, and they must then keep a sharp look out, as the markers have to signal any shot that may be on either target.

The procedure at the butts is as follows:—

Directly the shot is fired the target is run in, and the other one run out; the spotting disc is inserted in the bullet hole, and the men wait for the next shot. Directly it is fired, the targets are run in and out respectively (whether the shot is a hit or a miss).

The marker then signals with the signalling disc, directly on the face of the target, placing his disc, so as to cover the spotting disc, and calls out, at the same time, the value of the shot, which is immediately entered on the Butt Memorandum by the Non-Commissioned Officer.

In the meantime, one of the other men has found the hit on the inside target, and inserted the spotting disc into it.

The next time the target comes in it will be found to bear *two* bullet holes, *i.e.*, one with the spotting disc. in it, and a new one. The spotting disc is then changed into the new hole, and the old shot pasted out.

When the *Cease fire* sounds the targets are situated thus—one *outside* the butt bearing a spotting disc, the value of which has already been signalled, and one *inside* the butt, the shot upon which has not yet been signalled.

The procedure then is to change, or run in and run out, the targets, and complete the signalling of the shot on the inside target *before* the red flag is put up.

Thus, when the firing recommences, both targets will be clean again. This rule must be strictly adhered to, in order to avoid confusing the Register-keeper and the Non-Commissioned Officer in the butts.

For the annual course the hits are pasted out on the *back* of the target. Thus, as already stated, the shot marks are easily counted, however numerous they may be, by the officer checking targets. With a full section of 20 men, there cannot be more than 100 shots on each target. The last shot, even with 99 others on the target, is easily seen by the light shining through the bullet hole and by the paper bulged out at the back.

In order to prevent the possibility of fraud, or improper marking—

(*a*) The markers should be of different companies.

(*b*) The Non-Commissioned Officer in the butts should be of a different company to that firing.

(*c*) The Register-keepers also should be of a different company, thus leaving the Sergeants of the company firing free to look after their own sections.

(*d*) After the *Commence fire* has sounded, the sections should be changed to different firing points.

(*e*) As no one in the butts, except the senior Non-Commissioned Officer, is allowed to go outside the butts when the *Cease fire* has sounded, the chance of the markers finding out who is to fire next on any target is spoilt.

The Stop Butt.

When it is necessary to build a new range, a stop butt of the following pattern will be found the most economical. It fulfils all the requirements of the Musketry Regulations, and has been approved of by competent authority.

Four-section Range.

Length...	120 feet.
Width at bottom..	6 ,,
,, top	2 ,,
Height...	16 ,,

These measurements are, of course, subject to local conditions, such as, extent of ground behind targets, nature of range, &c.

This stop butt is simply a wall, built of kutcha brick and plastered. The bricks are laid in mud and a quantity of earth is thrown up behind each target to receive the bullets. (See Fig. 18.)

For a stop butt of such a length as 120 feet, a couple of buttresses will be necessary, two in front and two behind.

The height of the butt depends on local circumstances, but, on a plain, with more than 1,500 yards clear behind the butts, 16 feet is quite sufficient.

Cost of Butts.

For a two-section range, the whole cost of building stop butt, two markers' butts, plastering, throwing up earth behind targets and building ramp in front of targets was Rs. 100. (A two-section range built in the usual manner costs about Rs. 400.)

For a four-section range, the cost of butts, etc., similar to the above, should be little more than double, or Rs. 250 at the outside.

As an improvement, markers' butts of the pattern shown in Fig. 19 would add greatly to the protection of the markers from the sun, while the cost would be but small.

Two or three posts, with a light roof resting on them and on the top of the butt, form a shed into which the targets run. The side should be covered with matting; it is not necessary to make the roof bullet proof owing to the height of the marker's butt.

The distance that the targets should stand in front of the stop butt depends on the situation of the range, but should be as little as possible. There being no ironwork or stone exposed to fire, there is no danger to the markers from splashes of lead, and the closer, therefore, that the targets are to the bank of earth in front of the stop butt the easier it is for the markers to see the position of a shot by the dust thrown up.

Cost of Fittings.

Four-section Range.

			Rs.	A.	P.	Rs.	A.	P.
14	Wood posts... 5' × 8" ...	@	0	12	0	10	8	0
7	Iron rails 3—8' 6" 4—5' 6"	,,	2	0	0	14	0	0
40	Holes drilled...	,,	0	1	6	3	12	0
16	Bolts and nuts.	,,	0	12	0	12	0	0
16	Wood-washers	,,	0	0	6	0	8	0
480	ft. Telegraph wire... ...	,,	1	0	0	4	12	0
8	Timbers, round 4—5' 6 × 4" 4—8' 6 × 4" ...	,,	0	6	0	3	0	0
8	Trollies complete	,,	7	0	0	56	0	0
8	Boat-hooks	,,	0	8	0	4	0	0
1	Spanner...	,,	1	0	0	1	0	0
1	Steel punch	,,	0	8	0	0	8	0
1	Cutting punch (for spotting discs)...	,,	0	8	0	0	8	0
					Total Rs....	110	8	0

Add—

Lime, coal-tar, broken brick, labour, &c.

Instead of using wooden posts it is a better plan to use 5 feet lengths of iron rail sunk in the ground similarly to the posts, but of course the expense would be greater. If white ants get at the wooden posts they will not last longer than about a year.

Moving Target.

			Rs.	A.	P.	Rs.	A.	P.
4	Trollies complete	@	5	0	0	20	0	0
240	ft. Telegraph wire... ...	,,	1	0	0	2	6	6
4	Bolts and nuts	,,	0	12	0	3	0	0
4	Wood washers	,,	0	0	6	0	2	0
	Rope for pulling, say ...					2	0	0
					Total Rs....	28	4	0

Extras.

		Rs.	A.	P.	
Target frames,	3rd class, ...	1	12	0	each.
Ditto,	2nd ,, ...	2	8	0	,,
Ditto,	1st ,, ...	3	8	0	,,
Ditto,	Moving target	0	12	0	,,
Spotting disc pins	... ...	0	0	9	,,
Paper *Civil & Military Gazette* ...	...	6	8	0	per md.

A native firm of *Mistris* in the Sadar Bazar, Ferozepore, will supply all these fittings at the cost mentioned above; the firm is *Purbhu Dial and Dowlut Ram.*

Two-section Ranges.

For a two-section range the arrangement of the wires is somewhat different to that of a four-section range. It is presumed that a moving target line would not be required on a small range; still it can be easily fitted if necessary.

Fig. 20.

Stop Butt, Two-section Range.

The following measurements will be found sufficient, but are, of course, subject to local conditions, such as space behind targets, &c.

Length of butt	45 feet.
Width at bottom	6 „
Ditto top	2 „
Height	16 „

The stop butt and markers' butts are built similarly to those already described.

Cost of a Two-section Range.

Stop butt, and markers' butts, built of kutcha brick laid in mud, plastered on all sides, earth banked up behind targets and ramp built, complete Rs. 100.

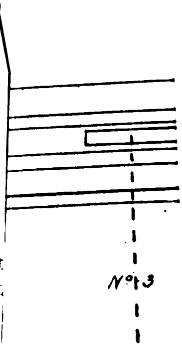
Fittings.

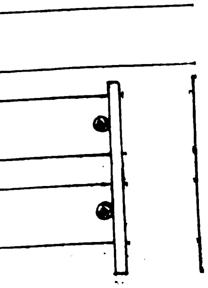
				Rs.	A.	P.	Rs.	A.	P.
6	Wood posts...	5′ × 8″ ...	@	0	12	0	3	8	0
3	Iron rails ...	5′ 6″ ...	„	2	0	0	6	0	0
16	Holes drilled ...	...	„	0	1	6	1	8	0
8	Bolts and nuts ...	...	„	0	12	0	6	0	0
8	Wood washers ...	...	„	0	0	6	0	4	0
240	ft. Telegraph wire	..	„	1	0	0	2	8	0
4	Timbers round,	5′ 6″ × 4″	„	0	6	0	1	8	0
4	Trollies, complete	...	„	7	0	0	28	0	0
4	Boat-hooks... ...	...	„	0	8	0	2	0	0
1	Spanner	...	„	1	0	0	1	0	0
1	Steel punch ...	...	„	0	8	0	0	8	0
1	Cutting punch ...	...	„	0	8	0	0	8	0
						Total Rs....	53	4	0

Add—

Lime, coal-tar, broken bricks, labour, &c.

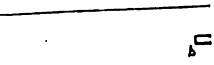
All other details are the same as for a four-section range.

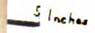




Plan, showing pa

FIG. 10

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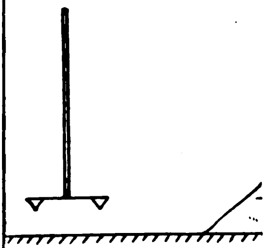

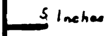
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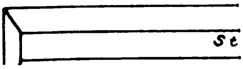
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REGULATIONS FOR THE SELF ENTRENCHMENT OF INFANTRY WITH THE SMALL SPADE.

Translated from the Russian, by Capt. A. E. JONES, 23rd Pioneers.

EXPLANATORY PREFACE.

To the "Regulations for the self-entrenchment of infantry with the small spade."

The "Temporary Regulations" for the self-entrenchment of infantry with the small spade issued in 1879, formed the first attempt at a manual for the troops in entrenching work.

Remembering the novelty of the work at that time, as also the equipment not long before of the troops with the small entrenching tool, the above mentioned regulations were called temporary, and it was resolved to substitute others for them as soon as possible.

At present, through experience of the utility of the temporary regulations themselves, as also of the small spade, and full consideration of the question of the meaning of the entrenchments and of their connection with tactics, the above mentioned "temporary regulations" have been revised, and new "regulations for the self-entrenchment of infantry with the small spade" have been compiled; in which the opinions of the superior officers which were called for by the grand committee on the organization and training of the troops have been embodied.

The principal difference between the old and the new regulations is as follows:—

In the new it is laid down,—

(1.)—Under what circumstances it is useful to have recourse to entrenchments.

(2.)—Which of the various commanders has the right to order the troops to entrench, under those circumstances, when such an order does not come from the commander-in-chief, but when unforeseen circumstances demand it.

(3.)—The nature of the entrenchments suitable to the various parts of the fighting line; viz. those of the firing line, *i. e.* the first line, as also those of the company, battalion, and main reserves, *i. e.* of the second line.

By the information contained in the "regulations for the training of infantry and artillery in the work of field engineers," which will be published in a short time, the questions asked by many superior officers, where to seek information regarding the strengthening of a position, not alone by infantry, but also by artillery entrenchments, and also by field works, and by the adaptation of local objects to the defence, will be decided.

The small spade has been taken as the measure in the construction of entrenchments on account of the slight acquaintance of the rank and file with feet and inches.

[illegible] of entrenchments. The idea of [illegible] up to that of another, [illegible] in the former "regulations"; [illegible] to take advantage of a trench on [illegible] construction.

[illegible] — [illegible] trench gives room for one rank, [illegible] are accurately worked out the lengths [illegible] as also the methods of extending [illegible]

[illegible] are given, both as regards the trace, [illegible] and the construction of the trenches [illegible] construction of traverses and ways of com-[illegible]

[illegible] on the laying out, tracing, and construc-[illegible] fire, and when not under [illegible]

[illegible] of trenches to the required [illegible] and on the necessity [illegible] in firing and aiming from them is [illegible]

[illegible] the ammunition waggons has [illegible] the construction of such cover is [illegible] the spirit of field entrench-[illegible] necessary to undertake this work [illegible] when it is impossible to find [illegible] Moreover, the insertion in [illegible] infantry and artillery in the [illegible] and mode of construction of [illegible] to take advantage of it, when-[illegible] the whole mass of the infan-[illegible]

[illegible] means of preparing the ground in [illegible] being well swept by fire, is also [illegible]

[illegible]

[illegible] WITH THE SMALL SPADE.

[illegible]

[illegible] conduct of war, both on the [illegible] unfrequently obliged to have [illegible] in order, by covering our [illegible] to the enemy by our fire, [illegible]

[illegible] the field of battle have an [illegible] construction of trenches of [illegible] to take advantage of them, [illegible]

[illegible] carried out under the guidance [illegible] with the very lowest. [illegible] strength of the men allow, to [illegible] cases :—

On the Defensive.—Always, and especially on those parts of the position, where the ground, by its natural strong points and cover, does not satisfactorily fulfil the demands of the defensive, or where the localities and cover are in existence, but to put them in a state of defence, would be more difficult, and on the whole less advantageous, than the construction of entrenchments.

On the Offensive.—When it is necessary simply to secure a position which may have been seized to guarantee oneself against a counter-attack by the enemy, and to construct supporting points which will aid a further offensive advance, or, in case of a reverse, secure the retreat.

4.—On the Offensive, always, and on the defensive, only if time permits, the disposition of the troops, according to the strength of the position, should be ordered by the commander-in-chief. In all other circumstances, all separate commanders, down to the company commander inclusive, are obliged without delay and on on their own initiative, to take all necessary measures towards strengthening the position entrusted to them for defence.

5.—As regards the direction of the workmen towards strengthening the position, the duties of those in command are as follows:—

(1.)—The regimental commander will fix the general extent of the position of the regiment, both in a defensive, as well as in an offensive fight; and will divide the position into portions, stating the general direction of the line of trenches, both for the different battalions of the regiment, as for the batteries under his command. Besides trenches, he carries out the various arrangements for strengthening the position, by field-works, by placing in a defensive state those local obstacles which demand a special preparation for the defensive, by the construction of communications throughout the position, and so on. Engineers will aid him in these duties.

The above mentioned duties, as regards strengthening the position, are obligatory on the commanders of small fractions of the regiment, if these fractions are obliged to act independently.

(2.)—The battalion commander will verify the accuracy of the laying out of the trenches by the companies of his battalion, and will make, if he considers it necessary, any change required in their direction. He takes care that the disposition of the trenches of his battalion agrees with the disposition of the artillery or infantry trenches on either side, and gives general directions regarding the position of any guns under his command.

(3.)—The company commander ought to be able to quickly select, and mark out for his company, the most advantageous direction and extent of the line of trenches, having regard to the ground and the position of his company. He will superintend the construction of trenches by men of his company, both for the firing line as also for the reserves.

NOTE.—The entrenchment of artillery is usually considered a very laborious task by the infantry, but owing to their small numbers, it is difficult for the gunners to cover their own guns. The selection of ground for the guns and the superintendence of the construction of artillery trenches is the duty of the artillery officers.

(4.)—Several examples of profiles of entrenchments. The idea of a gradual advance from a trench of one profile, up to that of another, has been given more prominence to than in the former "regulations"; and this, in its turn, makes it possible to take advantage of a trench on the defensive at any moment during its construction.

(5.)—It is stated.—What sort of trench gives room for one rank, and what for two ranks, with which are accurately worked out the lengths of trenches necessary in different cases, as also the methods of extending the workmen at different distances.

(6.)—More detailed instructions are given, both as regards the trace, the extension of the workmen, and the construction of the trenches themselves, and also of the construction of traverses and ways of communication.

(7.)—The difference between the laying out, tracing, and construction of trenches under a more or less heavy fire, and when not under fire, is also stated.

(8.)—The importance of the adaptation of trenches to the required direction of the fire, of their occupation by troops, and on the necessity of instruction for the rank and file in firing and aiming from them is also noted.

(9.)—The construction of cover for the ammunition waggons has been omitted. This was done because the construction of such cover is a very large undertaking, rather beyond the spirit of field entrenchments; and also because it is generally necessary to undertake this work only in very exclusive circumstances, *i. e.* when it is impossible to find natural cover for the ammunition waggons. Moreover, the insertion in the "regulations for the training of infantry and artillery in the duties of field engineers" of the nature and mode of construction of each cover makes it possible for the troops to take advantage of it, whenever it appears necessary, without worrying the whole mass of the infantry by instruction in this duty.

(10.)—The importance and the means of preparing the ground in front of the position, so as to permit its being well swept by fire, is also stated.

REGULATIONS
FOR INFANTRY ENTRENCHMENT WITH THE SMALL SPADE.

I.—Introduction.

1.—Through the modern system of the conduct of war, both on the defensive, as on the offensive, we are not unfrequently obliged to have recourse to the construction of earthworks, in order, by covering our own troops, to cause the greatest possible loss to the enemy by our fire, and to lessen as far as possible our own losses.

The trenches generally employed on the field of battle have an especially insignificant profile. The rapid construction of trenches of this nature, by those troops which are destined to take advantage of them, forms the problem of self-entrenchment.

2.—Self-entrenchment should be carried out under the guidance and responsibility of all commanders, beginning with the very lowest.

3.—It is advisable, if time and the strength of the men allow, to have recourse to entrenchments in the following cases:—

On the Defensive.—Always, and especially on those parts of the position, where the ground, by its natural strong points and cover, does not satisfactorily fulfil the demands of the defensive, or where the localities and cover are in existence, but to put them in a state of defence, would be more difficult, and on the whole less advantageous, than the construction of entrenchments.

On the Offensive.—When it is necessary simply to secure a position which may have been seized to guarantee oneself against a counter-attack by the enemy, and to construct supporting points which will aid a further offensive advance, or, in case of a reverse, secure the retreat.

4.—On the Offensive, always, and on the defensive, only if time permits, the disposition of the troops, according to the strength of the position, should be ordered by the commander-in-chief. In all other circumstances, all separate commanders, down to the company commander inclusive, are obliged without delay and on on their own initiative, to take all necessary measures towards strengthening the position entrusted to them for defence.

5.—As regards the direction of the workmen towards strengthening the position, the duties of those in command are as follows:—

(1.)—The regimental commander will fix the general extent of the position of the regiment, both in a defensive, as well as in an offensive fight; and will divide the position into portions, stating the general direction of the line of trenches, both for the different battalions of the regiment, as for the batteries under his command. Besides trenches, he carries out the various arrangements for strengthening the position, by field-works, by placing in a defensive state those local obstacles which demand a special preparation for the defensive, by the construction of communications throughout the position, and so on. Engineers will aid him in these duties.

The above mentioned duties, as regards strengthening the position, are obligatory on the commanders of small fractions of the regiment, if these fractions are obliged to act independently.

(2.)—The battalion commander will verify the accuracy of the laying out of the trenches by the companies of his battalion, and will make, if he considers it necessary, any change required in their direction. He takes care that the disposition of the trenches of his battalion agrees with the disposition of the artillery or infantry trenches on either side, and gives general directions regarding the position of any guns under his command.

(3.)—The company commander ought to be able to quickly select, and mark out for his company, the most advantageous direction and extent of the line of trenches, having regard to the ground and the position of his company. He will superintend the construction of trenches by men of his company, both for the firing line as also for the reserves.

Note.—The entrenchment of artillery is usually considered a very laborious task by the infantry, but owing to their small numbers, it is difficult for the gunners to cover their own guns. The selection of ground for the guns and the superintendence of the construction of artillery trenches is the duty of the artillery officers.

6.—During instruction in entrenching work, the principal attention should be directed towards practising the laying out and tracing of trenches on the ground, and then only on their actual construction. With this object, and also to avoid excessive fatigue to the troops in entrenching a position in time of peace, if they have sufficiently mastered the technical difficulties of the work, in certain manœuvres they may confine themselves only to laying out and tracing the trenches on the ground; and to beginning a small cutting, not bringing the trenches up to their full profile.

II.

The use of the small entrenching tool, its distribution in the ranks, and the execution of earthworks with the small spade.

7.—The small entrenching tool is intended for,

a. The strengthening the fighting disposition of the troops by entrenchments and earthworks, and towards adapting local objects to the defence.

b. The lessening or removal of the obstacles met with towards a free movement of the troops.

c. The construction of cooking places, latrines &c. in camps and bivouacs.

8.—Having in each company 80 small spades (Fig. I) and 20 small axes, they are divided, the spades by 20, and the axes by 5, per section, by which means they are distributed equally by sections, excluding the first divisions of sections which have one spare axe each.

The man into whose charge the tool is given is responsible for its preservation. The selection, however, of the men for carrying the tools depends on the section commander who will periodically change them.

9.—In peace time half the number of tools are kept in store, and the other half carried by the men and used for practical work.

To preserve the spade, it should be cleaned carefully after being used, the iron rubbed dry and, if possible, well greased.

10.—With the small spade it is possible to work lying down, sitting, kneeling, and standing. The choice of position and the means of carrying out the work, are in the majority of cases usually left to the workman himself.

11.—In spade work it is useful to observe the following:—

a. To break ground, not by using all the bottom edge of the spade, but only one corner.

b. To drive the spade into the soil slantingly, and not to press it down perpendicularly.

c. To cut the roots of plants or small trees by the sharp edge of the spade.

d. Large stones are not to be broken up by means of the spade, but in order to clear the ground, they should be thrown out with the help of the neighbouring workmen.

e. If stones or thick roots of trees are met with, which are difficult to remove, it will be necessary to work round them.

III.—On Entrenchments in general.

12.—Infantry should know how to construct trenches both for the fighting line and the reserves.

13.—Both the portion of the fighting line, as also of the reserves distributed in trenches, must fulfil the same tactical demands as if they had been disposed in the open, and, in fact, the fact of being covered by trenches should enable them to fulfil these demands in a still greater degree. The distribution of troops in trenches makes it possible,—

(i.) To dispose both the fighting line and reserves in a much denser formation, *i. e.* by whole sections, companies, and even battalions; which, however, does not exclude those special occasions, when for better fire over and observation of certain portions of ground, a separate distribution of skirmishers is necessary.

(ii.) To bring the reserves nearer the firing line when it is considered that they will be more useful there.

14.—The firing line entrenches itself according to circumstances by separate or extended sections, or by companies.

15.—The company reserves usually entrench in close order; but, to meet the enemy with a greater mass of fire, it will sometimes be useful to extend the company reserves in trenches, not with the fighting line, but in prolongation of it.

16.—The battalion reserves usually entrench either in line, or in column, so as to remain more concentrated. In the latter case, the cover raised for the battalion reserves consists of trenches placed immediately in rear of each other.

17.—The second line, *i. e.* the separate reserves, having received in special cases the order to entrench, preferentially constructs trenches for columns, also with the object of being more concentrated.

18.—The length of trenches for the firing line is calculated by allowing not less than one pace per man, when the men are distributed in them for fire in single rank. But the length of trenches for the reserves is calculated by allowing one or two paces per file: the latter measure is allowed in those circumstances, when the necessity is foreseen of also firing from these trenches.

NOTE.—In case of necessity, it is possible to fire in single rank from those trenches which have been constructed by allowing one pace per file, but only one half the number of men should occupy them.

19.—The trenches for a column consist usually of not more than two trenches placed one directly in rear of the other; because troops entrenched in deeper columns would suffer more from fire, and, moreover, in a deeper column formation, the front would be narrower than in a less deep one, and the musketry defence of the ground immediately in front would be weaker, if in the course of the fight the necessity of firing from these trenches also arose.

IV.—Profiles of Trenches.

20.—The construction of trenches ought to be carried out in such a manner, that they can be utilised with ease at any moment for the defence, because the troops may possibly be exposed to an attack by the enemy during the period of their work. The profiles of trenches which are shown in Figs. 2, 3, 4, and 5, fulfil these conditions, as they render it possible to gradually advance from the smallest profile to the largest.

Note.—In the construction of trenches the spade is used as a measure, because the whole length of the tool from the top of the handle to the bottom edge of the spade is equal to 1 foot $8\frac{5}{8}$ inches, which may be taken approximately as $1\frac{1}{2}'$; the length of the handle from the top to the haft is 6″, and the width of the spade is $5\frac{3}{4}''$, say half a foot.

21.—Trenches have the profiles shewn; *viz.*, in Fig. 2—for firing in a half lying down position; Fig. 3—for firing kneeling; Figures 4 and 5—for firing standing: but all these trenches can only accommodate a single rank, except the last, which is intended for the accommodation of a double rank.

In the above-mentioned figures the following is the total height from the bottom of the trench to the top of the excavated earth.

For firing half lying down	$2\frac{1}{2}'$
„ kneeling	3′
„ standing	$4\frac{1}{2}'$

For men above the middle height, the total height above the bottom of the trench ought to be increased.

For shelter from musketry fire, shrapnel, and splinters of shell, the thickness of the parapet in its thinnest part ought to be not less than $1\frac{1}{2}'$ for sand and $2\frac{1}{2}'$ for earth.

22.—Trenches having the profiles shewn in Fig. 4 (for single rank) and in Fig. 5 (for double rank) undoubtedly give better cover than any others, and therefore they ought to be preferred, if time and the strength of the men permit of their being constructed.

23.—In order to simplify the instruction of the men, the trenches constructed both for the firing line and the reserves should have one and the same profile. The difference between them consists only in the greater or less length of trench.

24.—In the profiles given in Figs. 4 and 5, the rear of the trench should be sloped away, to prevent the enemy obtaining any advantage from it, in the event of his occupying the trench later on.

In case of a prolonged occupation of the trench, the bottom of the ditch is given a slight slope to the rear; and to carry off the water a drain is dug at the rear part of the trench, by means of which the water is drained off on to lower ground, or into an excavation made expressly to receive it.

25.—The profiles shewn above are sometimes changed according to circumstances.

In disposing trenches on a slope, their normal profiles change in connection with the greater or less steepness of the slope.

If rock or stony ground is found under the upper thin surface soil, and also if a better fire is necessary over the near foreground, then the line of fire from the trenches should be given a greater elevation, and the excavation made not deeper, but wider, and the parapet increased in height.

In constructing cover, hillocks, ditches, hedges, stones, trees, bushes, and so on, may often be utilised, and especially stone, when there may happen to be but a small quantity of earth.

V.

The disposition of the trenches on the ground, the determination of the line of fire of the trenches, and their construction.

26.—In disposing trenches on the ground, we should particularly keep in view among other things the following.

(i.) To especially occupy with trenches the highest points of the ground, but in doing so, to push as far forward as may be practicable, in order to bring as heavy a fire as possible to bear over all the ground lying in front. With this object the construction of a few trenches below the crest, on the slope towards the enemy, gives among others the following advantages.

a. In case of the occupation of the trench by the enemy, he will have a very limited field of fire.

b. By placing the trenches on the side of the hill sloping towards the enemy, the area liable to suffer loss from exposure to his fire is decreased, because the reserves being disposed on the reverse slope will suffer but little.

(ii.)—If it is not possible to fire over all the foreground from one line of trenches, either by long range or close fire, then such ground should be brought under fire by constructing a detached trench or by means of a second line of trenches.

(iii.)—Sometimes several lines of trenches are constructed on high ground with steep slopes, so that several tiers of fire may be brought to bear over the immediate foreground.

(iv.)—If it is not possible to fire over the near foreground, even from several lines of trenches, as may often happen when the slopes are very steep, then such portion of the foreground should be enfiladed from another part of the position.

(v.)—The disposition of trenches in view of and near commanding ground is very disadvantageous, and should therefore be avoided.

(vi.)—A trench should not be exposed to an enemy's fire either from flank or rear.

(vii.)—To enable one's own troops to assume the offensive, intervals should be left between the trenches suitable for the passage of artillery, and if necessary, of cavalry also, as the trenches themselves offer no obstacle to the advance of the infantry.

(viii.)—The disposition of the trenches should be such, that in case of the enemy occupying them, they would still be exposed to fire, for instance from a second line of trenches, or, the enemy having occupied them, he should either not be able to fire on us from them, or he should only have a very limited range of fire.

27.—When the ground assigned for the construction of the trenches is approached, we should at once proceed to determine the direction of the line of fire and to fix it definitely. For this purpose, if the tracing and distribution of the work is not carried out under fire, the commander of the detachment constructing the trench, having determined approximately the direction of the line of fire and the angles of the trenches, marks the latter by men, or by pegs, stones, or clumps of brushwood &c. (Fig. 10). Then, proceeding along the proposed line, and kneeling down here and there so as to bring his eye on the same level as the eyes of the firing line, he looks carefully to see if the foreground is well covered by fire, up to a distance at the very least of from 600-800 paces ; *i.e.* whether there is not some hollow or other, not exposed to fire, in which it may be possible for the enemy's riflemen to obtain shelter. If such an uncovered spot exists, then the line of trench first marked out is changed, and moved either backwards or forwards, so as to bring fire to bear on this spot, unless indeed the place selected from which a good fire can be delivered, interferes with the fire from the neighbouring trenches.

By tracing in this manner, the deficiencies in the line of fire correct themselves. When the tracing is finished, the length of the projected trench is measured in paces and altered wherever it appears necessary.

Generally speaking, the amount of fire to be delivered from trenches intended for the firing line and reserves is determined by tactical considerations, but in distributing the troops in the trenches, special attention should be directed to first obtaining a good field of fire over the immediate foreground, as in these cases it is usually impossible to change the front first determined on ; or is only possible, by openly changing the disposition of the troops. The salient angles of the trenches ought not to be too acute (not less than 60°), and the re-entering angles should be obtuse (not less than 120°).

28.—It is not generally possible to arrange for the delivery of fire from every part of a long line of trench, so that from every section the ground in front may be well covered both by close and distant fire, and it will usually be sufficient, if a fairly good fire can be delivered from every section of the trench.

29.—If the tracing of the trench is carried out under a weak or casual fire, then according to the nature of the enemy's fire and depending on it, the tracing will be done in the day time, at night, or during twilight, as laid down in section 27, and will be carried out in such a manner, that it will be possible for the men told off to mark the angles of the trench, either to kneel, sit, or lie down, so as to be less *en evidence*. In tracing trenches in the twilight, or at night, the angles should always be preferentially marked by men, as men can always let it be known where they are by their voice.

30.—The line of a trench intended for a company, or a larger unit, does not always admit of being traced in a straight line, or on exactly the same plan, but depends on necessity. Sometimes, according to the ground, it may be necessary so to trace the trench, that the prolongation of small portions of it will be in the direction of the enemy. If from such places it may also be necessary to fire, then at every 12-15 paces, a certain portion of the ground about 4 paces in length is dug out, and from the earth so excavated a traverse is formed from 5-7 paces in length, and about equal to two spades in height (Figs. 11 & 12.) To obtain cover from the enfilade fire of the enemy, it is advisable to give the traverse a length of 5 paces, but if the rear of the trench is also exposed to fire from the enemy, the length of the traverse is increased to 7 paces. Passages are made round the traverses to preserve communication along the trench, and for facility of passage the rear side of the angles should be rounded off.

31.—The flanks of trenches should be directed somewhat to the rear for protection from enfilade fire.

32.—If time permits, it is sometimes useful to construct the trench longer than in the afore-mentioned paragraph, (§ 18), or to make it in several lines, so as to have the power to occupy all or any of these lines either by large detachments of the defenders, or by placing the nearest reserves in them.

The above mentioned supplementary trenches are constructed, either at the same time as or after the main trench. In the first case, they are made by special working parties drawn from the reserve, or from other troops near at hand; and in the second case, by the same men who constructed the main trench.

IV.

Extension of working parties, tracing, and construction of trenches.

33.—The troops detailed for work preserve strict silence, both when marching to the ground, as also during work time, especially if the work is carried out during the night, or in view of the enemy, or under his fire.

34.—If the trench is to be constructed by several companies, its whole length is proportionately divided for work into company portions. Afterwards, if the extension of the working parties and the tracing of the trench is not carried out under the fire or in view of the enemy, the troops detailed for work, having all the spades in one rank, proceed by companies to the ground, in whatever formation may be considered suitable, and each company halts opposite one end of its position, according as it is right or left in front, about 20 paces from the intended line.

Sometimes, to hasten the extension of the working party, the company may be divided when marching to the ground into half-companies, according as the company commander considers it advisable; in which case the half companies halt opposite both ends of the work told off for the company, so as to extend the workmen at the same time from both ends of the trench. The company commander may have recourse to this when he can entrust the extension of the workmen of the other half company to some person acquainted with the work required.

35.—When the company arrives on the ground, the whole company or the two separate half-companies ground arms and take off their accoutrements. The company (half-companies) then advances to the line of trench determined on, and halts parallel to it, so that the first rank, *i. e.* the men with the spades, is at four paces distance from the trench; they are then extended to two or one pace by files.

For an extension by files to two paces, the files on the left open out from the right file for an extension to the left (and the files on the right from the left file for an extension to the right), to the distance of the arm extended with the spade, holding the latter at full length by the end of the handle, so that the bottom edge of the spade touches the shoulder strap of the file on the right (or left), Fig. 13. For an extension to one pace per file, the files open out either way to such a distance, that the ends of the fingers of the extended hands of the left (or right) files touch the shoulders of the men on the right (or left), *i. e.* the finger ends of the right hand would touch the left shoulder of the man on the right, and *vice versâ.*

On the order to commence work, the rear rank if necessary lies down, and the front rank advances to the intended line, and checks its extension, the toes of the workmen touching the line; the line is then spitlocked with the spade, and this line so marked is taken as the foot of the interior slope of the parapet. Each man marks his place by digging out a sod, or clump of earth, from between his feet, and by excavating a small trench, to join these marks to the portion on the side from which he extended.

The division, and tracing of trenches, for a half company, section, or similar detachment, is carried out in the same manner as the tracing &c. of trenches for a company.

36.—If the extension of the working party, and the tracing of the trenches, is carried out near the enemy, but not under his fire, it is performed in the same manner as in the preceeding paragraph, with this difference only, that, for greater preparedness against an unexpected attack, the arms are not grounded, but remain with the men till the actual beginning of the work, *i. e.* until the extended front rank arrives to within four paces of the intended line. They are then ordered to turn about and ground arms by placing the butt of the rifle near their feet, with the bolt uppermost, and are again fronted towards the enemy, Fig. 14. In the same manner the men of the rear rank keep their arms with them when ordered to extend.

37.—As soon as the tracing is finished, and its general correctness verified, the men advance and commence work by order. Breaking the soil as much as possible within their own portion and keeping the breadth of the spade from the spitlocked line, they throw the earth immediately in front of them towards the enemy, and thus endeavour to lower the ground they stand on, and increase the height of the parapet; they afterwards widen the excavation and increase the thickness of the parapet. The berm is intended to facilitate jumping up from the ditch on to the parapet, and also to prevent the earth falling back into the ditch.

When the trench is finished, it is sometimes useful to decrease the width of the berm by cutting it away, as it diminishes the cover. Sods and hard clumps of earth should not be thrown into the parapet, but should be collected together near the excavation, in order, by revetting the interior slope, to increase its steepness, and thus to furnish better cover for the men occupying the trench, and make it more comfortable for them to fire from.

To give greater solidity to the sod revetment of the interior slope of the parapet, the sods should be cut as much as possible in a regular form, for example a square ; the sides being equal to the length of the foot. In constructing a sod revetment, the sods are placed as in brick-work.

For cutting the sods, axes can if necessary be utilised as well as spades, and should be used by the men of the second rank.

38.—Each portion of work is detailed, not for one man alone, but for a file, and the relief of the workmen should therefore be carried out approximately every 20 minutes.

39.—The construction of trenches for infantry formed in column, is carried out in exactly the same manner (Figs. 15 and 16), but with the following additions: (1) one trench is placed behind the other at a dis- of not less than seven paces, the measurement being made between the lines marking the foot of the interior slope of the parapets, and (2) the relief, except that portion of it belonging to the rear trench, is usually placed during worktime on one flank of the trench, in order not to hinder the workmen. For facility of communication, both with the country and also between trenches placed immediately behind one another, the ends of the ditches are made with a very gentle slope, and in the rear trench passages are made having a breadth of 1½ spades at the bottom. The surplus earth thus obtained is employed partly in thickening the nearest portion of the parapet, and partly is scattered about on the ground.

40.—It is sometimes useful to make immediately in rear of the trench, earthen traverse shelters, similar in profile to the trenches (Fig. 17 and 18), and connected by short ditches with the main trench. These passages for communication should be about 1½ spades in width at the bottom.

Such shelters are intended either for the company reserves in two ranks, if for any reason it does not seem advisable to place them with the fighting line, or at any great distance from it, or, in case of a prolonged occupation of the trenches, for giving first aid to the wounded and so on.

The earth obtained from these ditches is placed partly on the parapet of the shelter, but should principally be used in constructing side parapets to the ditches about 1½ spades in height.

41.—All work carried on near the enemy, especially in twilight, or at night time, should be safe-guarded by sentries, or by an extended line according to circumstances.

42.—In constructing trenches, it is always useful to keep a reserve, both for filling up casualties among the men, and for strengthening the numbers of the workmen, wherever the work from the nature of the soil may be especially difficult ; as also for constructing traverses and communications, and for furnishing outlying sentries or a covering line &c.

Each traverse (Fig. 11) is constructed by from 12-16 workmen, (in two reliefs), and the parapet of the trench in front of the traverse is made by these same men from an exterior excavation, as this parapet would have been thrown up from the ditch of the trench, if the traverse had not been in place.

There should also be detailed in each company a reserve of workmen and a covering party, approximately one or two sections, if the work is not carried out under the fire of the enemy.

In every case the length of a trench ought to be sufficient for the numbers intended for its occupation for defence; the reserve of workmen, as also the men of the covering party and sentries, join the working party constructing the trench.

43.—The large entrenching tools with the troops are generally given to the reserve, and are employed in those places where it is either difficult or impossible to use the small tool; for instance, where the ground is especially hard, or when the excavation is not being carried on successfully.

44.—The construction of the trenches is discontinued, and the men leave the work, even when near the enemy, only by order. The men ought then to take up their arms, leaving their spades on the work. If the enemy should attack while the work is not yet finished, fire is opened by order from behind the unfinished parapet.

45.—The above mentioned trenches are constructed in the manner stated, until discovered by the enemy or under a weak fire from him. But if a detachment under a heavier fire, and not covered by any local objects, receives orders to entrench, it proceeds as follows. Each man provided with a spade places his rifle alongside him in such a manner, that it does not interfere with his task, and, taking hold of the spade, sets to work lying on his left side (Fig. 19), and digs out near himself and parallel to his body, a furrow equal in length to the distance from the elbow of his left arm to his knee; in width, equal to the length of the handle of the spade; and in depth, equal to the width of the spade itself. The sods and earth excavated are piled up in front of his head, and he endeavours to cover himself as quickly as he possibly can. When this work is finished, the man crawls into the furrow he has just dug out, and, lying on his right side, excavates a similar furrow to the right, digging out and throwing the earth in the same direction towards his head, Fig. 20. This work is carried out more quickly when the digging is done sideways, instead of lengthwise, and the excavation will all the sooner assume the appearance shown in Fig. 21.

Having finished his task, the workman gives the spade to the other man of his file, who proceeds to excavate a similar trench. The men not employed at work continue to fire.

These shelter pits may be improved, if it appears necessary, approaching gradually to the profiles shown in Fig. 2 &c.

46.—It is advisable, especially if it is to be expected that the work will be carried out under fire, to rehearse in a safe place the extension of the working parties, and the tracing of the trenches. We must remember that during time of war the personnel of any body of troops quickly changes, and it may happen that, in a detachment, there will be men entirely unacquainted with self entrenchment, or who have forgotten it through want of practice.

Men should also be placed along the road leading to the ground where the trenches are to be constructed, to point out the road, especially at night time, or during a fog.

NOTE.—It should be remembered that, as in war time, both the laying out and construction of trenches will sometimes have to be done in twilight or at night, the troops should be practised in similar work in time of peace.

47.—To protect the heads of the men as much as possible from the enemy's fire, and to preserve their morale, also to enable a better aimed fire being delivered from the trench, we ought, if time permits, construct from earth or sods some small head cover on the top of the parapet, which, however, must not interfere with the fire over the ground in front.

To construct head cover, the earth is piled up on the parapet to a thickness of not less than the length of the spade, and in this earth loopholes are constructed, the sides being splayed outwards, and the interior dimensions being the same as the tray of the spade. The loopholes are sometimes covered with earth, supported on branches, brushwood, &c. Four sods, placed two on each side of the parapet, and covered by two other sods placed alongside each other, with the grass underneath, afford a certain amount of protection to the heads of the firing line, if the sods are good, and if they are covered by earth, or some other means, so as to make it difficult to distinguish them from the parapet of the trench.

48.—On occupying the trench, each man should be ordered to adapt it to his own height, *i. e.* to heighten, or lower, the portion of the parapet immediately opposite himself; to construct, or to re-arrange, the loopholes; to aim through these loopholes over every portion of the immediate foreground; and to make a place for ammunition in the interior slope of the parapet to the right of his rifle.

NOTE.—To accustom men to fire from loopholes with the least possible loss to themselves from the enemy's fire, they should be properly instructed in aiming, and firing from them. The positions of men firing in trenches is shown in figures 22, 23, 24, 25, and 26.

49.—In order to cover the trench as much as possible from the view of the enemy, we ought to avoid giving a sharply defined appearance to the exterior slope of the parapet; and, moreover, on the side visible to the enemy, we should place sods, branches, old thatch, snow, and so on, endeavouring by these means to diminish as much as possible the difference between the external appearance of the parapet and the ground surrounding it.

50.—In wet weather it is advisable to cover the bottom of the ditch with branches, dry leaves, thatch, and so on.

51.—If the troops occupying the trench are in momentary expectation of an attack, the rifles are usually placed against the interior slope of the parapet, when thatch, leaves, &c., should be placed under them to preserve them from damp, or a support should be constructed for each rifle from two forked branches.

52.—If troops occupy the trench for any time, covered ways of communication should be constructed in a safe place, both between the lines of trenches, and to the rear, for instance, to the place where the

ammunition waggons are stationed, and so on. They are usually
in zigzags, the branches being so directed that the enemy cannot e
them. The length of each zigzag is approximately from 40-60 pac

These ways of communication cease, when the road lies belo
level of the horizon, under cover of high ground, or other local obst
Sometimes also, zigzags may be dispensed with when the passage is
for a short distance, or when, being oblique to the front, it cann
enfiladed even from the side where it has no parapet.

53.—To increase the accuracy of the fire of the defenders, we sh
measure the distance in paces from the trenches to several well det
objects in the immediate foreground. If such things do not exist, t
should be constructed in front of the defenders' position for the s
object, special marks, made from stones, lumps of earth and sods, sta
branches bent down with the ends stuck in the ground, and so on.

54.—It ought not to be forgotten that the possibility of a good
over the immediate foreground is one of the most important means
strengthening the position, and therefore in most cases, it is not on
useful to cut down, burn, and generally destroy, all cover, such
buildings, hedges, small trees, snow-drifts, hay-stacks, and so on, whi
could cover the enemy from fire, but it is also useful to render harml
for the defence, those objects which, not covering the enemy from fire, no
the less cover him from the view of the defenders, for instance, to be
and trample down, wheat, and other standing crops in the fields, to cu
down all brushwood, shrubberies, &c. &c. The ground should be thu
prepared to a distance of not less than 600-800 paces in front o
the position.

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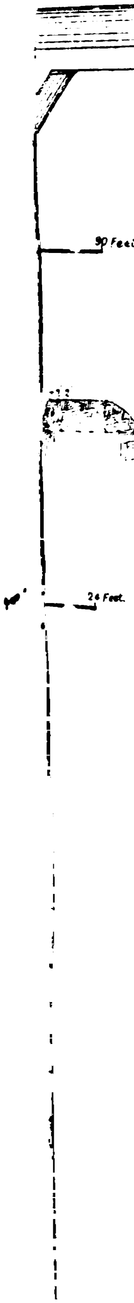
90 Feet
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THE NEW GERMAN REPEATING RIFLE.

Translated from the *Revue Scientifique* by Lieut. A. R. Browne, 2nd Battalion Border Regiment, Interpreter in French.

The change in the armament of the German army may now be considered as an accomplished fact, which, though barely mentioned by the press whilst it was in the process of completion, is now officially confirmed by the new instructions inserted in the Musketry Regulations.

This change consists, as is generally known, in the adoption of the repeating rifle, "1888 pattern",—the fifth type of arm issued to the Prussian army in the last fifty years.

Let us give some account of these changes, commencing with 1839, in which year the smooth bore rifle was grooved.

Two years later, in 1841, the smooth bore gave way to the "needle-gun," which was not, however, issued to the whole army till 1862. The "needle-gun" was a first step towards acceleration of the motions of loading and aiming; the ballistic qualities, however, were not appreciably developed till after the 1870-1 war, when the Mauser rifle was adopted. This was a great improvement on its predecessor, both as regarded range and accuracy.

Fourthly, the Mauser was, in 1884, converted into a magazine arm, officially known as the "1871-84 rifle," which has now become obsolete after only six years' service.

These dates show us how short, now-a-days, may be the life of these arms which cost such enormous sums.

When the small bore question became prominent, the German Government instructed their Trial Committee (Gewehr-Prüfungs-Commission), sitting at Spandau, to consider the problem of supplying the army with a small bore and quick-firing weapon, and, as a result of this enquiry, a rifle of ·309 inch calibre on the Männlicher system was officially approved of and its adoption decided upon.

Meanwhile, experiments had been going on at a private (the Rothweil) powder factory with a view to producing a smokeless powder. The Government itself, however, taking the matter in hand, succeeded, after extensive and laborious operations at Spandau, in attaining the desired result at the same time as the new rifle was adopted.

Accordingly, so long ago as February 1889, an arrangement was made with the Austrian small arm factory at Steyr to supply 400,000 repeating rifles of a pattern similar to that in use by the Austro-Hungarian army. At the same time, the firm of Loewe of Berlin contracted for the necessary plant to furnish the same quantity copied from the first consignment.

The distribution of this new rifle began in the first weeks of the year 1890. The Guards and 9th corps had been supplied with it by the end of February. Speaking generally, the German press gives us to understand that the entire active infantry forces of the empire were armed with their new weapon by the end of April 1890.

A pamphlet by Colonel Transfeldt, "Das Infanterie Gewehr, 1888", gives a complete description of the rifle. The mechanism is not, properly speaking, original, being in fact that of the Austro-Hungarian Männlicher, *i e.* bolt action and self loading motion, but with some improvements in details.

The striker, inside the bolt, is worked by a spiral spring, and is attached to the cocking-piece by a short arm. The rifle is cocked by the motion of drawing back and pushing forward the bolt, and the combined action is worked by a lever or bolt, which can be turned a quarter of a circle to the right, or moved longitudinally backwards and forwards.

As regards the repeating action, the "body" is perforated at the bottom by a rectangular open groove, the size of which corresponds to that of the upper part of the loader or cartridge box, G. This open groove is meant to give passage to the cartridges, which thus come into position at the entrance of the chamber. From outside, the position of the loader is shown by a rise or rather a projection in front of the "small." In this projection is fitted a sort of box (the magazine) of the shape of a rectangular parallelopiped, at the bottom of which is a spring divided into two parts, which we shall call "branches."

This spring, called the "elevator", u, maintains a constant upward pressure on the loader, which after its introduction into the magazine rests on the upper branch.

The loader or cartridge box, made of sheet steel, holds five cartridges placed one over the other. Its rear face or side, made of stiff sheet iron, is pierced in the centre by a small slit, which allows the pin of a spring catch, a, let into the stock, to pass into it and thus ensures the holder being held tightly in its place. This is technically called "engaging."

No sooner is the cartridge box or loader inserted through the rectangular groove before mentioned, fixed and held tight as described above, than the pressure of the upper branch of the "elevator" is felt to act on the cartridges alone, and it forces them out and up in succession, as will now be described.

It will be seen on reference to the illustration of the rear view of the loader, that the side faces or sides, which are made of thin sheet steel, are bent inwards on their upper and lower edges, at the points of junction with the rear face, in such a manner as to hold by the elasticity of their pressure, the cases of the uppermost and lowermost cartridges, whilst leaving the greater part of these cartridges free.

The slope which the bulged in sides of the holder thus offer, allows the spring of the "elevator" to act directly on the fifth or lowermost cartridge.

Under this pressure from beneath, the grooved upper face of the cartridge box opens out and gives passage to the first or uppermost cartridge, which thus reaches the entrance of the chamber, into which it is pushed by the forward motion of the bolt.

The trigger having been pressed, the movable breech is brought back, the cartridge-case thrown out and back (vide description of cartridge below), and its place immediately taken by the next cartridge, and so on in succession for the five rounds.

When these rounds have been discharged, the spring becomes fully released, so that the now empty cartridge box having no longer any support, falls to the ground automatically through the opening made for the purpose in the bottom of the "body."*

If, on the other hand, one should wish to remove the cartridges from the magazine without firing, a pressure of the thumb on the pin of the locking-spring catch would be sufficient, for then the cartridge box released from restraint and free to yield to the action of the "elevator", would be pushed up and out, where the soldier would receive it in his hand.

The German service papers lay great stress on this system of "loaders" or cartridge boxes, as compared with the tubular magazine of the 1871-84 rifle, which was placed in the stock under the barrel. The latter certainly had the advantage of holding three more cartridges than the "loader," but it seems by its position to have greatly weakened the frame-work of the rifle.

Moreover, the "1888 pattern" rifle, though a repeater, is well adapted for use as a single-loader, and even should the soldier have begun using the contents of his "loader", he is not obliged to fire the whole five rounds in quick succession.

But the most interesting innovation is in the arrangement of the barrel. The first object has been to relieve it of external appendages, such as fittings, sights &c., which impede expansion, in accordance with the report of the trial committee, that inaccuracy of a rifle should often be attributed to the irregular expansion under heat of the barrel.

Secondly, a remedy was needed for the practical inconvenience caused after the discharge of any large number of rounds by the excessive heating of the barrel, preventing the soldier from grasping it properly with the left hand.

To attain these requisites, the barrel has therefore been enclosed in a second or false barrel, on which the back and fore sights have been fixed, and a space of roughly $\frac{1}{50}$ inch has been left between the two barrels, which, thus separated, are screwed into the body. (See drawing of cross section).

In front, near the muzzle, the false gradually curves inwards towards the real barrel, the two being brought together at the muzzle by an outer band, which leaves only an imperceptible space between them.

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* In order to understand this apparently paradoxical fact of the cartridge box or loader falling by its own weight when it is *empty*, it suffices to examine the engraving giving a rear view of the box. It will be remarked, that the latter is sufficiently tight at the top and bottom to prevent cartridges from escaping, but not enough to prevent the finger, v, of the elevator, from passing freely. So long as any cartridges remain in the box, the latter is held by the top cartridge, and when, finally, the last cartridge is withdrawn, the box falls, as it is no longer arrested by the finger of the elevator, which allows it to pass freely.

The barrel, or rather the real barrel, is thus a perfectly homogeneous cylinder, the calibre of which is ·309 inch, reckoned between the "lands."

The grooves are four in number, and make a complete turn from left over to right in 9·443 inches. The "fixed sight" is at 275 yards, and the extreme sighting given is 2250 yards. The length of the rifle is 4 feet 9 inches with, and 4 feet 1 inch without, the bayonet. The weight unloaded is 8 lbs. 5¾ oz., that is to say, 1 lb. 12 oz less than the Mauser 1871-1884 rifle, notwithstanding the extra barrel.

These figures show us that the thickness of the barrels has been reduced to a minimum, and the *Revue Militaire de l' étranger* seems to question whether this be not a fault, bearing in mind the strength of the new gunpowder; also, from another point of view, whether the space left between the barrels will not foster damp and dust, the two leading factors towards the depreciation of a rifle.

The cartridge case has no projecting rim, and is only stopped from going further than necessary into the barrel by the conical shape of the chamber. In order therefore to facilitate extraction there is a circular groove about ·039 inch from the base. (See drawing of cartridge at o.)

The case is made of sheet brass and holds 38½ grains of brown gunpowder, which gives only a weak report and a very slight puff of smoke.

The bullet, of cylindro-ogival shape, is made of hardened lead sheeted over with nickeled steel, and weighs ... ... 223½ grains,
Total weight of one cartridge ... ... = 424 grains.
„ length ditto ditto ... ... = 3·25 inches.
„ weight of loader with 5 cartridges = 5·42 oz.

The loaders are made up in packets of three; the soldier carries two of these, weighing 1 lb. 1¾ oz., in each front pouch, and six in the rear pouch, making a total of 150 cartridges, with a weight of 11 lbs. 1·42 oz., carried on the person.

For loading on carts or storing in magazines, the packets are made up by fifteens in ammunition boxes weighing 15 lbs. 12½ oz.; these boxes are placed by fives in chests, "1888 pattern," which hold 1125 cartridges and weigh 92 lbs. 7¾ oz.

The company ammunition cart will carry 9000, and the battalion cart 22,500 rounds.

Initial velocity of bullet ... ... = 2034 ft. per second.
Extreme range „ (angle of 32°) = 3280 yards.
Penetration „ (109 yards) = 1 block of fir, 31½ in. thick, and 36 in. of sand.
Ditto „ (1970 yards) = 1 fir plank, 1·96 thick.
Ditto „ (328 yards) = 1 iron plate ·276 „

From the results of practical experiments, we learn that a thickness of 30 inches is the least that will ensure safety from the bullets of this rifle behind an earth parapet. Even thin brick walls will not give absolute security, for several bullets striking on the same spot will make a breach. Finally, six filled haversacks placed one behind the other, were perforated by each bullet fired at the nearest one.

With a rifle possessing such ballistic qualities, the tactical system hitherto in vogue must evidently be considerably altered. As a German writer (Das Neue Gewehr und das Rauschschwache. Pulver. Hanover 1890) remarks, shelter-trenches and other cover thrown up on the battle field have no longer any "raison d' être", unless they are at least 39 inches thick; and an engagement on the offensive at any rate, will have to be prepared for by approach works thrown up by night, as in the siege of a fortress. Otherwise, deployment at an enormous (technically speaking) distance from the enemy's position will be necessary.

Another feature, for which the German press predicts a marked importance, is the increased number of rounds which troops will have at their disposal on the battle field. Each German soldier will come into action with 250 cartridges, 150 on his person, and the remainder in immediate reserve. We can therefore no longer be guided by the experience of late wars in our estimate of the consumption of ammunition in a general action.

The following gives the general tenour of the *Militar Zeitung's* remarks on the tactical question raised. The time when thin skirmishing lines prepared the way for the employment of shock tactics, is now past; in future, the *only* form of fighting possible will be in skirmishing order. All tactics will yield to fire tactics, or in other words, to the establishment as soon as possible of a superiority in rifle fire.

The first or skirmishing line, of considerably more strength than hitherto, will not, on arriving at 660 yards from the position, be able to reckon on any immediate support from the second line, as the intensity of the fire at this distance will no longer allow any reinforcements to venture across the beaten zone.

The first line will be thus more or less thrown on its own resources, and should have, to ensure success at the decisive moment of the attack, a supply of ammunition sufficient to beat down the fire of the defence. On this condition alone could the second line be pushed forward in support of the troops already engaged.

Such are the general points put forward by the press in its commentaries on the change of armament, and they give us an interesting general insight into the tactical tendencies of the German army, tendencies which are moreover plainly marked both in their recently issued "Musketry Regulations", and in the alterations made in the general system of large manœuvres.

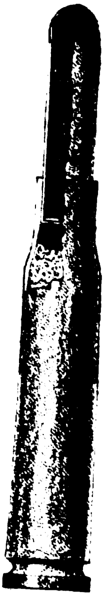
APPENDIX.

Note by Translator.

Some figures regarding our own new rifle are appended for purposes of comparison.

	German.	English.	*Remarks.*
Weight of rifle	lbs. oz. 8 11·17	lbs. oz. 9 6	*German.*—Including one loader with 5 cartrides. *English.*—Including oil bottle, jag, and one magazine.
Length of rifle without bayonet ...	ft. in. 4 1	ft. in. 4 1·85	
With bayonet	ft. in. 4 9	ft. in. 5 1·85	
Weight of bullet	grains 223½	grains. 217	
Calibre of bore	inch. ·309	inch. ·303	
Rate of spiral	inches 1 turn in 9·443	inches 1 turn in 10.	*Roughly.* *German.*—One turn in 32⅓ calibres. *English.*—One turn in 33 calibres.
No. of grooves	Four	Seven	
Muzzle velocity	2034 f. s.	2250 f. s.	*English.*—Muzzle velocity given is that estimated for, actually it is only 1800-50 f. s.
Description of rifling	Mauser	Metford	
Action	Bolt	Bolt	
Fixed sight	275 yards.	300 yards.	
Highest graduation ...	2250 ,,	1900 ,,	*English.*—Graduations of dial sight which extend to 2,800 yards have not been included.

VABLE BREECH OPEN.



BLANK
CARTRIDGE.
(Hollow wooden ball.)

PRACTICE
CARTRIDGE.
(Hollow brass cartridge.)

L OF 1888.

Jas. Arbery
1890

UNIV. OF MICH.

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2nd Battalion Border Regiment, Interpreter in French.

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THE GERMAN AUTUMN MANŒUVRES, 1890.

By Major OTTO WACHS, Z.D.

Reprinted from the Royal U. S. I. Journal No. 154.

The manœuvres which took place in August and September last, and in the year before, have for two reasons given many interesting results; one is *powder with little smoke*, and the other the *magazine rifle with small calibre.* For brevity, we will speak of them in our article of to-day as new powder and new rifle. Both have brought *tactical* and *technical* innovations.

We will try in the following pages to give a short account of the results of our own experience, and the opinion of competent judges.

The manœuvres began as usual in August with the exercise of *regiments* and *brigades;* then followed operations of the *detachments*, representing skirmishes founded on the principles of war. Each party is generally composed of three to four battalions of infantry, two or three squadrons of cavalry, three batteries of artillery, and a detachment of pioneers.

The commanders of the detachment are given their tasks by the leading officer, who usually has the rank of general; they form their resolutions according to them, and lead the troops by day and by night. After the combat has taken place, the leading officer criticizes everything concerning the command, the behaviour of the three arms and that of the outposts. On this occasion the leading officer gives the decision as to which of the parties has fulfilled its duties, and which way would have been shorter or better. German discipline does not allow the judgment of the leading officer to be contradicted. The umpires can give only the result of their observations, what they have seen during the action, before or after the criticism of the leading officer, but the decision rests alone with him.

We come now to the grand manœuvres—brigade against brigade, division against division or against a marked enemy, army corps against army corps, or, as took place in Silesia under the command of the Emperor, two army corps against a marked enemy.

During the exercises of detachments, and during the grand manœuvres, we had occasion to observe new tactical forms in the three arms and in connection with each other; but not the forms alone have altered, new principles have appeared.

We begin with the "queen of battles," with the *infantry.*

The *low trajectory* of the projectile from the new rifle, its *accuracy* in hitting the aim, and its *wider sphere* of activity, have caused the *distances* to be *increased* from where the beginning of the action takes place. The "old school" cannot longer hold its own against the new time, new weapons, and new principles. This *soi-disant* old school taught that the infantry only could have any effect on the enemy when it approached it as nearly as possible, and thought it not necessary first to shake the enemy by the fire of the artillery and infantry. It was on the 18th of August, 1870, on the battle-field of St. Privat, where the Prussian Guard had to pay with so many lives for the adherence to this old principle. But even when the "needle-gun," with its shorter range, could be used for such a reason, the "Mauser gun" never could; it and the magazine rifle have completely superseded it.

Till the beginning of this year it was thought a tactical fault if troops began to fire at a greater distance than from 400 to 500 metres. This has been altered suddenly by the "Terturen," that is to say, by the supplements to the "Felddienst-Ordnung" These supplements say plainly that it is forbidden for columns and lines to stand unsheltered if within range of artillery and infantry fire, and they order to begin firing at greater distances than before. These two directions change at once the tactics of the columns and of the lines into the tactics of the shooters. According to the new rules, the infantry fought in the first line in swarms of shooters, and where the country was favourable the troop were allowed to rally. Years ago, no one would have imagined that the time was so near that, as happened in the last manœuvres, ten companies of one regiment were engaged as shooters, while only two remained closed as a reserve. It happened that when an army corps was in action, whole brigades fought in masses as shooters. The new directions also have caused the former divisions of an army—the Treffen—to disappear; and the Treffen of to-day are nothing but reserves in rear, to make good the losses in the first rank. In consequence of the wider sphere of all projectiles from cannons or rifles, the distances between the troops of the first and second line, or, to use a technical expression, between the echelons, have become greater, and are now from 400 to 500 metres. If we reckon the distance at which our shooters begin to fire at the enemy (600—700 metres), we see that from the enemy in the first line to our reserve a distance of from 1,000 to 1,200 metres remains.

The distances given here are for a sheltered country; many officers think that they must be larger if one is obliged to fight in an open country, otherwise the losses of men and horses would be too great. We have already seen that in fights only with shooters in the first line, and have given the small troops following different loose formations to have a chance against the projectiles. One formation, to give an example, is that the troop has only two men in front; the humour of the soldiers calls this formation earth-worms. We cannot think such deep formations advantageous to-day, where the projectiles of a rifle have penetrating force enough to kill three and four men behind one another at a distance of 400 to 500 metres. And what mischief would the fire of artillery effect!

As we are speaking of the field of battle, we must not forget that the infantry has great skill and dexterity in throwing up *earth-works*. One we saw rise in fifteen minutes: it had a strong outline or profile. This field limit was for shooters lying down, if for kneeling ones, from 30 to 40 minutes are required, and if the shooter is standing, from an hour to an hour and a half. But the infantry which resolves to hold its position is not satisfied with digging one limit, but wherever the ground allows it, limits are raised one above the other. Earth is the best material for shelter against the projectiles of infantry, but the outline must be nearly one metre thick. A brick wall of the thickness of the walls that surround villages, and trees in general, are little worth against the new rifle, which is the reason the defender did not use these objects as coverings and established rather a wall before them. But not the defender alone threw up walls, the aggressor did the same when halting for a while; in the hand of the one as well as of the other the spade has become a weapon. Before one position we saw pioneers draw strong wire round posts or stakes, and from tree to tree, in order to detain the enemy under the strongest fire and to prevent the passage of cavalry. The wires were from 0·50 metre above the ground, and afforded a good hinderance.

We will not forget to mention the little *towers, armed with a coat of mail*, and constructed by the late Lieutenant-Colonel Schumann. These towers were first used in the manœuvres, 1889, near Hanover. Eight of them were transported to a position of nearly 3 miles, at which were prepared walls, sheltered positions for artillery, &c. He found that the difficulty in bringing the towers into position was not great, and also that their value in the field was very considerable. They were used to strengthen weak points. Their cannons have a calibre of 3·7 and 5·3 centimetres, and fire bomb-shells, grapeshot, and shrapnel at a distance of 3,500 metres, firing forty shots in one minute. Only two men are necessary to serve the guns. Since the new powder is used the artillerymen are able to breathe in the tower, even when they shoot quickly. It has not yet been decided if these towers shall be used in a campaign on account of the bulk of the material for their transport and the ammunition.

With respect to the *arrangements of firing*, we have to say that this became less difficult than it was before, as the officers see their soldiers and can influence them morally, as there is no smoke, a circumstance that is very significant. The rule has been followed by the fire-leading officers to economize the ammunition of the soldiers, whilst the distances from the enemy are great, but to begin a hot fire when about to storm. Troops without cartridges are defenceless. If there should be a large target, though distant, visible only for some moments, as, for example, a battery in movement, one must fire rapidly at it. The smoke of the rifle is as little as when one lights a cigar; in damp weather the powder smokes a little more, and is visible for a longer time. The individual shooter, who is no longer veiled in smoke but to be seen if not sheltered from the enemy, is forced to do his utmost to profit by any shelter. Some regiments had fastened a little staff of iron near the muzzle of the rifle to rest the gun when shooting lying down.

The instances of *marching* were extraordinary, and to prove them we accompanied a battalion which marched that day at least 25 miles. The weather was then very hot, and the troops had not only to march over sandy ground, to pass hedges and walls, but to fight, and yet we did not see one straggler. Another battalion marched one day, nearly always engaged, 15 miles, was then commanded to the outposts, from where it was sent at 9 o'clock P.M. to venture upon an enterprise against the flank of the enemy. These troops returned into the bivouac at 3 o'clock A. M, after having marched 16 miles. At 6 o'clock A. M. the marching, fighting, &c., began anew, and on this day another 17½ miles must be marched. This battalion has in a short time marched 47½ miles, and that under difficulties. In this place we will mention that there are two sorts of marching, the *travelling march* (generally 14 miles in one day), and the *war march*, where no comfort is allowed and all is prepared to fight instantaneously. A regiment of infantry travels over 1 kilometre in about twelve minutes.* But the results such as those above only can be obtained by systematic training and control of everything on which the health and strength of the soldiers depend, and by the strictest observation of the discipline of marching. The secret of the result lies in the hard service of officers and non-commissioned officers, who do not rest till their men are as comfortable as possible, and till the soldiers have prepared their meals in the bivouac or in the quarters, if the men are provided out of stores, which is sometimes the case in the manœuvres, and is a proof as good for the Intendance as for the men.

This year the German *cavalry* was for the first time equally armed with lances. This weapon has many adversaries in the army, because it is said to be inconvenient for man and horse, to burden the horse and make it difficult to place the carbine as well as to fight on foot. The cavalry will get the new carbine (model 1888) next year. In some regiments experiments are being made with a new saddle.

The *strategical* service of the cavalry, that is to say, the service of information on which the commander-in-chief bases his resolutions and the plan to fight, has become very difficult on account of the new powder. When it was possible two years ago by small patrols of cavalry not only to find the enemy, but also to get information concerning his designs, it is to-day hardly possible to push cavalry near the enemy's position without sacrificing it, as it will be destroyed by shots before it has seen the enemy. The cavalry does not remark any smoke, and, though it hears the rifles and guns, it does not know from where the danger is, and it is impossible to learn by the ear the position of the shooting enemy when he is standing at different points and the detonations begin to fight with each other. And yet the cavalry must be, as it were, in the future the eye of the Army, but an eye which is willing at any moment to sacrifice itself. More difficult still to fulfil are the claims which the battle-field requires if it must act against artillery and infantry.

On some occasions we saw cavalry fight on foot and have influence on the result of the day; it happened to occupy important positions, and was able to hold them till infantry and artillery could arrive; another time, a pass far from the position was occupied during the night, and through this pass, which it secured, the infantry debouched the following morning; sometimes it succeeded in laying an ambush.

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* Over 3 miles an hour.

The perseverance in *marching* was very great, and after the manœuvres we found the horses in good condition. On one day a cavalry brigade was sent to flank the enemy, the distance ridden was not less than 37½ miles, ⅓ of which were through a narrow, hard way, ridden a long time in compact columns at one side, of marching infantry and artillery. To pass this last distance quickly, the brigade was forced to trot incessantly. Three squadrons of hussars had to pass the Föhrde (sund) of Flensburg, near Ekensund, which is here 114 yards broad; two squadrons were transported in ferry-boats, but the horses of the third were unsaddled, and swam through the sund, led by the hussars from boats; in two and a half minutes the horses swam through.

With great interest the cavalry manœuvres took place in August, where the Guards were engaged, as well as the manœuvres of two divisions of cavalry in September. With the first exercise four regiments were employed on each side, supposed to be the vanguard and rearguard of two armies; these manœuvres were therefore very instructive, as the two commandants alone knew where the troops should be in the night. The exercises demanded no long marches, but were extended very widely; small detachments had to swim often through the Spree. The two cavalry divisions which fought against each other were twelve regiments of cavalry strong, thirty-six guns, two battalions of infantry, pioneer, and telegraph detachments; these exercises took place between the Saar and the Mosel.

Just as significantly as the two arms spoken of, the new powder influenced the *field artillery*. To find out the distance between the enemy and our own position has become easier, as no smoke on our side hinders observation: it has also become difficult, because the lines of the enemy are not defined by smoke. If the artillery of the enemy is sheltered, and fighting has begun, one cannot find it by the sounds, and in time of war we are obliged to try to find the artillery which aims at ours by the lines which are made by the projectiles of the enemy in the ground. In order not to betray our position it is dangerous to change it (the règlement warns directly against change of position), if there are no pressing circumstances. But when a change must take place, then the artillery wants more scouts than in old times, who look for a new position and for the best way to reach it. More than ever the artillery must profit by favourable moments, and fire then as quickly as possible. As the rifle reaches farther now, the artillery is obliged to be more than ever prepared against infantry, and it is no longer able to unlimber the guns and to hold its position against the fire of infantry at distances of from 1,000 to 1,200 metres; this would be ruin. Shooting exercises with ball ammunition had the result that a company of 250 men, with only ten cartridges for every soldier, was able in fifteen minutes, at a distance of 1300 metres, to destroy a battery. In the same manner as the seeing and aiming at artillery has become more difficult, it has become easier concerning infantry, which oftener must change position. Only the artillery of two German army corps used the new powder during the manœuvres. One saw very little smoke, but remarked often a fire-flash that came from the muzzle, and the position of the cannons was betrayed when before them either was sand, which whirled after the shot, or if dry grass began to burn. The artillery was used in the manœuvres when possible in great masses, and in the field one hopes to gain the victory by the better practice in shooting.

Pioneers who had prepared the position for the artillery afterwards served it as guard.

More than ever this year were undertaken *enterprises at night*, generally going out from the main body of the outposts. The night was chosen to avoid the great loss of lives caused by the new powder and rifle, but these enterprises were undertaken to surprise the enemy and to obtain a commanding position for the action of the next day. Such a night expedition lays highest claims upon the discipline and order of the troops. Speaking of these enterprises, we must observe that one does not intend to fight night battles in the future, a view which does not put out the possibility of assembling before daylight, and with daylight to begin with superior forces a decisive battle (Tel-el-Kebir).

For some years, and also this year, many troops were given the *baggage*, or a part of it, to accustom the leading officer and the troop to these *impedimenta* (carriages of ammunition, of medicine, the columns of provisions, the detachments of telegraph and telephone, &c.,) which lengthen the marching columns and make them less movable, which must be sheltered on the march as well as in the bivouac and in the cantonment. If these trains were with the troops or not, in any case the orders for marching, fighting, &c., must be exactly the same as it would be in war time, when all the trains are with the army.

Whilst the infantry of the IXth Army Corps bivouacked *under tents*, it was only allowed in the XVIth Army Corps to take in the manœuvres, for officers and men, the same things as in war, and in no bivouac did we see *one tent;* the officers were lying at night near the men in the open air. When the troops had the carriages of ammunition with them, the *supplying of cartridges* was practised. That this supply shall take place at the right time is the duty of the commander of the battalion; he has to direct the carriages behind the line, and to take care that ammunition is brought to his companies in the fisrt line by soldiers who are trained for this service, or by the reinforcements which are sent there. In war the soldiers take the ammunition of the dead and wounded, and fill all their pockets with cartridges. It depends on the country and on other circumstances where the carriages of ammunition are placed, but, at all events, it must not be difficult to reach them.

A short time after one has arrived at the cantonment, officers and non-commissioned officers have to make themselves *acquainted* with the place and the country round it, that they may be able to give at every moment a disposition for defending it, &c.

With some battalions of riflemen *trained dogs* were of great use because they gave warning if anybody came near to the camp from outside.

The *helmets* covered with brass and the *buttons* of the uniforms were betrayers in particular when the sun was shining.

The *loading* and *unloading* railway carriages with infantry, cavalry, and artillery were executed fast and quietly.

The *result* of the German manœuvres is this: Because the commander-in-chief cannot get quick and exact reports about the enemy, the *deployment* of the troops must be more slow and more cautious; but not this alone, also the *crisis* of the fight will be more remote than before, because the engagements begin at greater distances and the firing must have longer time to do its work. As so many new factors must be taken into consideration, the demands on every man of the army, from general to the last soldier, have grown immensely and with them the responsibility. The *importance of the ground* and the good or bad use made of it, can decide, in particular with impromptu fights, the fate of the day. Artillery and infantry must support each other more than ever, and the infantry cannot reap the laurels in a ranged battle *without being aided* by artillery. Attacks in front against an enemy who has not been weakened by our projectiles *cannot succeed.* The defender will take *greater* profit from the new powder and new rifle than the assailant. The interference of cavalry has been more *limited* but is yet possible.

We conclude this article here, but suggest that now, more than ever, the result of the battles of the future depends on the SPIRITUAL and MORAL factors of the armies: the spiritual, as the claims to the character to self-dependence and to reflection have increased; the moral, because the terrors of the battle are no longer veiled in smoke, that intoxicated in some manner.

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THE MADRAS ARMY.

By Lieut. R. M. RAINEY, 12th Burma Regiment Madras Infantry.

A great deal has been written for and against the Madras sepoy. His admirers have, not very successfully, tried to show that he is just as good, if not better, than his brethren in arms of the Bengal army: they chiefly support their arguments on his past records, and faithful services, which are of course undeniable. But while a glorious past may without injustice be allowed him, the stern facts of the present time must be faced, and I will therefore only refer to the Madras army of days gone by, as far as is necessary to exemplify my remarks.

Those who have no faith in the Madras sepoy are numerous and powerful, and they are as a rule very bitter in their arguments. They look for, and greedily seize on every thing, that can possibly be turned to the discredit of the Madrassi; while they are strangely blind to all his good points, and even when he behaves with praiseworthy bravery, fail entirely to recognise it.

No one who is thoroughly acquainted with all the various races forming our Indian army could pretend to believe, that the Madrassi of to-day is as good a fighting man as the warlike races of northern India produce. Whatever he was in the past, years of internal peace and freedom from any frontier quarrels have gone far to quench his warlike instincts. The Madras army had for years been but little employed on active service, until the commencement of the Burma campaign in 1885. A few regiments were, it is true, sent up to Afghanistan during the last war, but they had very little actual fighting. This long respite from active service has undoubtedly had a very injurious effect on the army, and hundreds, nay thousands of men have enlisted without the very slightest expectation, and in truth, with hopes and confidence, that they would never have any harder or more dangerous duties to perform than garrison duties in the piping times of peace, living in comfort and surrounded by their families. For these safe and by no means arduous

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The good points of the Madras sepoy have so often been brought into prominence by the champions, and admirers, of the old Coast army, that it is hardly necessary to touch on them further than to briefly enumerate the most prominent.

Unswerving loyalty to the British Government is the chief characteristic of the Madras sepoy, which has stuck to him through generations, and makes him thoroughly reliable as far as faithful service is concerned.

The greatest confidence in his British officers, especially those who have been long in a regiment, is another characteristic.

Patience and willingness under most trying circumstances; performing the most irksome and tiring marches, heavy guard, fatigue, and other duties cheerfully, and without grumbling.

The Madras sepoy is but little troubled with caste prejudices, and in a well disciplined regiment, caste need never be felt to interfere with any duties, and consequently the men can shift for themselves, when rations, cooking pots, etc. are scarce, far better than most other races of India.

The superior intelligence of the Madras sepoy is very marked. They are better educated than any other class of natives who are enlisted in the Indian army, and are singularly useful as clerks, signallers, surveyors, and for all duties requiring extra intelligence or education. They excel as Sappers, and make very useful Pioneers.

Madrassis are wiry, tough, and possess great staying powers. They suffer little inconvenience from excessive heat, stand cold well, and are excellent marchers.

The chief faults and weak points of the Madras army are as follows:—

The system of allowing the men's families to live in the lines prevails. This has a very demoralising effect on the men, as soldiers, and is the greatest defect in the army, and the cause of much of the inferiority of the Madras sepoy. The up country sepoys, excepting a small percentage, leave their wives and families in their villages, and remit a portion of their pay to them, reserving enough to live on comfortably themselves. But the Madras sepoy has his family in the lines. His pay is seized on, and supports a host of relations, as well as his own wife and children; so that the poor sepoy is generally more or less underfed, not to say often half starved. The Madras sepoy belongs to a poor class, and cannot hope for any assistance from among his own, or his wife's relations for the support of his family. In addition to this, living is dearer in Madras than in other parts of India.

The enlistment of Northern Telegus, a class known not to produce good fighting men, is a serious mistake. Many men of inferior physique are also enlisted.

No spirit of emulation between regiments, or even companies, is possible in Madras to the same degree as in the Bengal army; for in Madras, Tamils, Telegus, Mussalmans, Christians, Pariahs, and other castes are all mixed together in companies. The system of caste companies is not in force, and men whose homes may be a thousand miles apart, who speak languages unknown to each other, differ in religion, customs, descent, and are in every way unsuited to each other, are crowded into one company. With this system, a subadar frequently cannot understand a word of the language spoken by half of his company, and the same of course applies to the jemadars, and non-commissioned officers. All the infanty regiments are composed of much the same material, namely, two-thirds Hindus, and one-third Mussalmans. With the Hindus are included Pariahs and Christians. Some regiments enlist more Tamils than Telegus, and some enlist a few so called Rajpoots and Mahrattas. These are descendants of men from the Bengal and Bombay presidencies, who in former times found their way down to the Madras presidency. The former make excellent sepoys, though they give a little more trouble with their caste prejudices, requiring dry rations on board ship, and so on. Most of them, however, enlist in the cavalry. There are authentic cases of the mild Telegu assuming a Rajpoot name, and enlisting in the cavalry, where he is not taken if he sails under his true colours. The cavalry as a rule enlist two-thirds Mussulmans and one-third Hindus (Rajpoots and Mahrattas only). The Sappers and Miners enlist chiefly Pariahs, Tamils, and Christians. All regiments enlisting the same men, the difference between good and bad regiments is chiefly the result of the work of the British officers. The men knowing that all regiments contain the same men as themselves, are not on their mettle to excel other corps; their relations are serving in various other regiments; and even if a regiment behaves badly and gets a bad name, the men know that the others cannot be composed of men individually better than themselves, and do not feel any disgrace. Hence "*esprit de corps*" is nearly impossible; there are no incentives to excel another company, or a regiment of another race or caste; and no appeal can touch the feelings of such a miscellaneous crew. The only possible exhortation is to uphold the credit of the regiment or presidency; but where "*esprit de corps*" does not exist such appeals fall flat.

Another weak point in the Madras army is, that the native officers and non-commissioned officers are very frequently promoted simply because they are smart at "baboo's" work, have a good knowledge of English, or show extra intelligence, without any reference to whether they have or are likely to acquire any influence, and to make themselves respected. Caste has still a very strong hold in some things, and it is quite the exception to find a low caste man who has acquired any marked influence over men his superiors in caste, and even if he can exercise his authority when on duty, he generally fails, or fears to do so, when off duty, and it is by no means an uncommon sight to see non-commissioned officers and even native officers, when off duty, paying respects to young sepoys of high caste whom they pass in the lines. It is needless to say that such a state of affairs as this is entirely subversive of discipline, and its disastrous effects are painfully visible, in the comparative lack of authority evinced by Madras native officers, who occupy a far lower position both in the eyes of the men and in their own estimation than those of the Bengal army; and, I fear, are not always treated with as much courtesy by the British officers. In fact the examination rage is carried too far in Madras. For each step of promotion, a (for natives) stiff examination must be passed; and, unless for exceptional services in time of war, none are promoted who have not passed the prescribed examinations: consequently, it is common for low caste men of no influence to be promoted over the heads of vastly superior men, who only lack higher education to make them most desirable non-commissioned officers. Experience does not show, when the moment of action arrives, that these highly educated men, who know the most confusing cautions and words of command off by heart, are any better than their less accomplished brethren of the Bengal army. If suddenly fired on from an ambush, the Madrassi does not then remember his carefully learnt lessons, and his word of command is not one whit better, if as good, as that of an up-country non-commissioned officer; while he does not keep his men as well under control.

The Madras sepoy undoubtedly requires more British leading than the sepoy of the north; yet the British officers in this presidency are more frequently changed from one regiment to another than in the armies of either of the other presidencies, so that the men seldom know their officers, and this handicaps them severely. Besides this, the officers, being frequently changed, take comparatively little interest in their men.

Many men are allowed to serve on long after they are past hard work, and these reduce the standard of efficiency; while, on the other hand, unnecessary obstacles are thrown in the way of men, who, having enlisted, find that military service does not suit them, and wish to take their discharge. This keeps a number of discontented men in the ranks, whose influence is most injurious. Many recruits of very poor physique are enlisted, who never fill out into good men. From the above causes, a large percentage of useless men are serving in the ranks of nearly every regiment.

The difficulty of getting recruits is severely felt. Some of the causes of this are :—(*a*) The pay of the sepoy has not increased with the labour wage, while living is dearer than formerly.—(*b*) Foreign service in Burma has been coming round too frequently, and hard work does not suit many of the classes enlisted.—(*c*) Field days, camps of exercise, the present system of training, musketry &c., are more irksome than formerly.—(*d*) The constant change of British officers is felt to place good men at a serious disadvantage, as new officers are frequently imposed on by worthless men, who curry favour with their new masters, and get advancement to the exclusion of the steady and more modest men. (*e*) The perquisites in the way of batta, rice, compensation, &c., are not as good as formerly. (*f*) Stoppages from the men's pay on account of clothing, necessaries, &c., are heavier. (*g*) The army has lost a good deal of its former prestige, and the service is not as popular generally as it used to be. (*h*) The disbanding of so many regiments has caused a feeling of doubt as to what will be done in the future. Colonels of Madras regiments, seem to be more tied down with regard to promotions, and have to make far more references to Army Head Quarters than in Bengal This necessarily lessens the power of the commanding officer, and has a bad effect.

The above are the chief defects in the Madras army. I will now endeavour to show how I think they might be greatly remedied.

To minimize the evils of the family system, the same arrangements as are in force in the Bengal army, regarding the number of families allowed to live in the lines, should be adopted. Messes should be made compulsory, or other steps should be taken to insure the men's feeding themselves properly. It may be argued, that the faithfulness of the Madras sepoy in the past has been insured by his knowing that his family were living in the lines in our power, and that the fact of their being married made it impossible for them to risk the safety of their families by mutinying. This may be true, but it need not prevent the system I recommend being adopted. It would not prevent the men marrying, and leaving their families in their homes, which is what up-country sepoys do. The expectation of pensions on completion of their service, or made payable to their families in the event of their being killed on active service, would be quite enough inducement, if any were necessary, to insure their remaining faithful. Of course leave and furlough would have to be granted on the same conditions as in the Bengal army. At present there are no leave and furlough rules in Madras.

The enlistment of weedy men, such as line boys frequently are, and town loafers, should be strictly forbidden. The chest standard of measurement should be raised to at least 33 inches. None should be enlisted, who do not belong to races or castes, known to have fighting instincts. No worthless Telegus should be taken on any account. Tamils, Pariahs, Christians, Telegus of the south of Madras, and Mussulmans only should be enlisted; the few so called Rajpoots and Mahrattas, who chiefly enlist in the cavalry being the only exceptions to this rule. In the cavalry no Tamils, Pariahs, Christians, or Telegus, are enlisted ordinarily, except the Christian farriers and trumpeters.

Instead of mixing anyhow all the various castes enlisted, it would be far better if caste companies, and indeed some caste regiments, were formed. The argument against this will of course be, that the present system makes mutiny nearly impossible, as the probability of a combination by a mixed body of men, so widely separated by caste, religion, descent, and in fact the absence of any tie, is most unlikely. This is, however, a great admission of the weakness of the system, as men who have so little in common, that they cannot combine when they meditate evil, are not likely to have that confidence in each other and that cohesion, which is absolutely necessary in time of war among soldiers. This want of confidence in themselves, and want of cohesion, is most marked in the Madras army, and has frequently struck me among the men who have been engaged in the operations in Burma since 1885. Existing circumstances do not justify the loss of efficiency this system entails. There is very little likelihood of the Madras army mutinying, and although many officers will howl out against any innovation, (especially if it gives them extra work or trouble), and will urge the danger of departing from ancient customs, they nevertheless lay open the question,—If all these precautions are necessary to prevent the Madras sepoy from becoming disaffected, is he really worth keeping up? And as his efficiency certainly suffers by these precautionary measures, could not we, by taking the same precautions with the more warlike races, obtain the same or even better results, and dispense with the Madrassi altogether? To refute this suggestion with the Madras army in its present state is difficult, but reflection shows that the mixing of various races in the Bengal army, which was adopted after the Mutiny, has not proved a success, and the present tendency is altogether in favour of caste regiments and companies. The objections to having all our native troops from one part of India are too obvious to need putting forward. The more sources we tap for our fighting material, the better for us; even though by so doing, we are obliged to introduce a race who do not quite equal the standard of our very best fighting races. The first thing is to decide what proportions of the various races of India we require. Secondly, to get the very best men that these races produce. Thirdly, to obtain the highest pitch of efficiency that these various races can be brought to. Fourthly, to make such use of these men, that the greatest value may be got out of their services. At present, in case of a mutiny among one portion of our native army, we are pretty certain that all will not join, and this is doubtless a very great point. But the importance of this safe-guard is considerably lessened, if, to keep the most warlike portion of our army in check, we are obliged to keep up another army, and it in an inefficient state, for fear that it also might mutiny. For though the Madras army as it is could well hold its own under British leaders against any combination of mutiny or rebellion, it is an open secret, that it could not be depended on against such foes as we may have to meet on our north-west frontier. If our greatest danger were from internal disturbances, we might be able without anxiety to leave the Madras army as it is; but as things are, it is imperative that the Madras army be kept up, and that every effort should be made to bring it to the greatest efficiency, so that we may make the fullest use of it, either within or beyond our frontiers. There are so many ways in which Madrassis might be made useful, that it would be a thousand pities if their enlistment were stopped; but the necessity for keeping pace with the times is urgent, and their efficiency as soldiers must be increased. Because a particular groove has been followed so far, there is no reason why improvements should not now be introduced. To begin with, caste companies should be established, and, if possible, caste regiments. If regiments which have a leaning now to any particular caste, were directed to enlist that caste only, and were designated by the name of the caste enlisted, a marked improvement would soon be apparent—for instance, the 15th and 24th Regiments both enlist a good class of Mahomedans, and have done so for years: they should be directed to enlist nothing but Mahomedans, and called the 15th and 24th Madras Mussulmans. In the same way, regiments who pride themselves on their Tamils should be directed to enlist Tamils only. Other regiments might be composed of Southern Telegus, or Pariahs, or Christians. A third Pioneer regiment should be formed. The Sappers and Miners might with advantage be increased. In the cavalry the same system could be adopted: three regiments might be Mussulmans, and one Hindus. An attempt might be made to utilize in the cavalry the horse-keeper caste. These men are excellent riders, have no caste prejudices, are a very quarrelsome, independent lot, and if kept in separate troops would, I believe, prove excellent sowars. If it were not considered advisable at once to start caste regiments, caste companies should most certainly be formed. The experiment might be tried at first in a few regiments. From Madras regiments various useful corps might be formed, such as railway, telegraph, pontoon, army service, ambulance &c., &c. These would minimize the number of followers and non-fighting men who accompany an army, and the intelligence of the Madrassi would insure the success of such organisations. While forming regiments and corps, as above, would enable the greatest use to be made of the Madrassi for service against enemies from outside our borders, their numbers and utility would not be decreased for services inside our dominions. Again, the exact value of each class of men forming the Madras army could readily be gauged. This is at present impossible, as with the existing jumble of races, no certainty can be expected. Greater chaos in a regiment could not exist, if Sikhs, Pathans, Goorkhas, Beluchis, Jats, and Hindustanis, were mixed indiscriminately in companies of the Bengal army, than exists in every Madras regiment.

The examination tests for promotion should be modified, and though I would not urge a retrograde movement in the matter of education, it should not be adhered to in such a hard and fast manner. While some highly educated men are a great advantage for performing the clerical part of the work of a regiment, still many otherwise suited by birth, caste, influence, &c., might be advantageously promoted. Half the promotion might go by educational tests (only men who are in all other respects fitted should be taken), and half the promotion might be given to men of influence, provided they were sufficiently intelligent to perform the duties of non-commissioned officers. In this manner a more trustworthy class of native and non-commissioned officers would be obtained, who had influence among and were respected by the men; and these, if caste companies were organised, might be looked to, to bring forward suitable recruits, and to maintain their companies up to full strength. They might be expected to endeavour to enlist only such men as would prove a credit to themselves, their companies, and regiments.

As more British officers per regiment are not likely to be sanctioned, every effort should be made to avoid changing officers with regiments. If caste regiments and companies were introduced, and railway, telegraph, and such like corps were organised, and the status of the Madras army were generally raised, more interest would be taken by the officers in their regiments, and fewer would be anxious to leave for the Punjab Frontier Force, the Commissariat Department, or any of the other roads of escape, so popular among many officers who find themselves booked for service with the Madras army.

Men past work should be got rid of at once. No sentiment should be allowed to interfere with this rule. The interests of the service should invariably be considered before those of individuals; but if turning old men out before their time of service was fully completed, were considered a breach of faith, and contrary to what the men were given to expect when they enlisted, a few "veteran corps" might be established, into which the ancients might be drafted for cantonment duties, only until their service was completed. Men who have no taste for soldiering, or who from force of circumstances do not wish to continue in the service, should be encouraged to take their discharge. These discontented men are a curse in a regiment.

The difficulty of getting recruits will be greatly lessened, when service in Burma is of less frequent occurrence. The system of caste regiments and companies would render the service more popular. The disbandment of a few regiments must have reduced the drain on the recruiting market.

If a genuine interest were evinced in the army; if the suggestions above enumerated were adopted, even in part, a great improvement might be looked for.

THE MEYWAR BHIL CORPS.

By Lieut. H. L. SHOWERS, Assistant to Agent to Governor-General, Rajputana.

The very scanty amount of information possessed by the outside world on the subject of the local corps of Rajputana and Central India, induces me to offer to the Journal a short history and description of the Meywar Bhil Corps, together with a few notes on the Bhils of Meywar in general, from among the wildest and most unreclaimed of whom the Corps is recruited.

All the local corps, with the exception of the Bhopal Battalion, are composed of the different aboriginal tribes who inhabit this portion of India; and it was with the object of tranquillising the country and reducing to habits of order and peace their lawless and predatory instincts, that Government first undertook the formation of these regiments. Thus in 1822 from the Mair tribe the Merwara Battalion was formed; in 1831 a battalion of Bhil police was raised in Kandeish, followed in 1841 by the Meywar and Malwa Bhil Corps. The Deoli and Erinpura Irregular Forces, consisting for the most part of Minas, were originally the Kotah and Jodhpur Legions respectively. They received their present appellations on being re-constructed after the Mutiny.

Of these tribes the Bhils are considered by far the most ignorant and uncivilized; and the Meywar section of them, occupying as they do a part of the country, known as the Hilly Tracts, which is particularly destitute of such civilizing influences as are afforded by the presence of large towns, good roads, railways &c., constitute at first sight about as unpromising looking material as possible wherewith to form a disciplined corps.

The Hilly Tracts of Meywar comprise that part of the country lying to the west and south of Udaipur, up to the borders of the States of Serohi, Mahi Rauta, and Dungarpur, between the 24th and 25th degrees of north latitude and the 73rd and 75th degrees of east longitude, and averaging some 60 miles across from north to south and 80 miles from east to west, with an area of about 4000 square miles. The district fully justifies its denomination of the Hilly Tracts. Throughout its whole extent there may be perhaps some half a dozen open spaces as much as a mile wide; but with the exception of these the whole country is an intricate and confused network of low stony hills. The general level of the country is about 1000 feet above the sea, while here and there hills of greater pretension are met with, rising to 2000 or 3000 feet. In between the hills are narrow little valleys, which are terraced up and formed into fields by the Bhils, and yield crops of rice in the summer, and gram or wheat in the winter, while on the slopes of the hills

Indian corn is extensively grown. In the less populous parts the hills are covered with thick low jungle, consisting for the most part of bamboo clumps, small sized teak, and the dak tree (*acacia leucophlœa*) with its fine scarlet blossom. Large trees are few and far between, the most common being the banyan, the mango, the *nim*, and the *mohva*, the last named producing during the early summer the flower from which is extracted the strong, nauseous spirit, so universally indulged in by the Bhils. Four rivers traverse the district, but none of them are perennial. Their deeper pools, however, hold abundance of fish, which the Bhil *shikars* in a method of his own. Taking with him his bow and a large quiver full of arrows, he moves quietly about in the water so as to get the fish on the move without clouding the water. His bow is all the while well drawn, and the instant an unwary fish approaches the surface of the water or attempts to leave the pool by its shallow outlet, the arrow is discharged and very seldom without scoring. He then goes on to the next and so on, till all his arrows are expended, when he proceeds to collect the spoil.

Very little is known of the origin and history of the Bhils. Tod in his "Rajasthan" tells us that "Ignorani Ballat," a prince of the great Lunar race of Rajputs, who flourished about 1300 B. C., was the progenitor of the race. The Hindus of course have various fables on the subject. One of these recounted in Metcalfe's "Central India" is as follows:—"Mahadeo when sick was one day reclining in a forest, when a beautiful damsel appeared; the first sight of whom effected a complete cure of all his complaints. The result of this interview was the birth of many children, one of whom, distinguished for his ugliness, slew the favourite bull of Mahadeo, for which crime he was expelled to the woods, and his descendants have ever since been stigmatised with the names of Bhils, or Ushaster, or outcasts." Whatever the origin of the fable, the Bhils have certainly always been an outcast race, being held in great contempt by Mahomedans aud high caste Hindus. This feeling, however, is easily traced in the intolerance of these castes towards all who do not hold with their religious prejudices, being accentuated in the case of the Bhils from their bringing the flesh of almost all animals, including snakes, crocodiles, and even carrion, within the range of their diet. Excepting the monkey, which is the symbol of the forest god *Hunuman*, it would be difficult indeed to find something they do not eat.

To learn anything of the condition of the Bhils prior to the time when the British Government took them in hand is extremely difficult. They have no literature of any sort, and of their previous history they are absolutely ignorant and unconcerned. Something might be gleaned from the histories of the various surrounding states, but the story would probably be pretty much the same all through, one of oppression on the part of the rulers, and rebellion and a perpetual warring against civilization on that of the Bhils.

The Census Report of 1881 gives the number of Bhils in Meywar as 166,343. This number is only approximate, for "owing to a very pronounced repugnance to being enumerated, a repugnance which in some instances led to a disturbance of the peace, no accurate census could be taken, and the authorities had to be contented with counting houses, and allowing an average of four persons to each house." The ignorant and superstitious mind of the Bhil could not but associate the mysterious preparations of the enumerators with some deep laid scheme, which to say the least of it would not be for their benefit. One of their ideas on the subject was that the counting of the men and women meant a redistribution of their wives and daughters. All the fat men were to be given fat wives, and all the thin men thin ones, and so on. Another theory was that the Queen wanted a list of all the inhabitants, so that at a given signal they might all be destroyed. A third and not unreasonable interpretation was that a more regular and heavier system of taxation was intended. It is believed that the present census will have to be conducted in much the same manner as the last. If, however, the matter were left to the local Raos and Thakurs, instead of being entrusted to specially appointed and strange officials, it is probable that a very much more reliable enumeration would be obtained.

The Bhils have no such things as towns and villages. Each family has its own little farm, separated from its neighbours by varying distances, but seldom less than eighty or ninety yards. The huts are made of mud or stone with roughly tiled or thatched roofs, and placed almost invariably on a hill or rising ground. If localities more or less inaccessible to horsemen are available, they are chosen in preference, the idea being to secure a handy retreat from the clutches of their natural enemy, the Raj official and his *sowars*. It is probably the same object that induces them to avoid living in numbers together, for as long as they can separate and get away to the hills and jungles, they are pretty safe from pursuit. A group of several of these isolated habitations comprises what is called a *Pál*. Each *Pál* is presided over by a *Gometi* or village headman, whose authority in all important matters is paramount. His office is hereditary, a successor being acknowledged quite irrespective of his qualifications for the post. This is in marked contrast to the ordinary usage of semi-savage tribes, where the leader attains his position from being physically or otherwise the best man among them; and it goes to illustrate the strong clan feeling that exists among the tribes. This feeling indeed is one of their most prominent characteristics. Of a simple and trusting nature, they allow themselves to be guided in all serious affairs by their immediate chief. At his call they will immediately assemble for any undertaking. A fellow-clansman too has but to raise the shrill Bhil cry called the "*Kilkee*" to at once obtain assistance. The cry is taken up and repeated from hill to hill; and the whistle of Roderick Dhu in the Highlands was not more effective than is the Bhil *Kilkee* in suddenly raising, as if from out of the earth, hundreds of armed warriors. When the Bhil Corps practises the "attack", this cry takes the place of the usual "cheer" at the "final rush." The noise is most unearthy, and calculated one would think to startle most civilized troops out of their very wits.

A traveller under the safe conduct of the Gometi is perfectly secure, as illustrated by Captain Tod. "Many years ago one of my parties was permitted to range through the Arivulli tract; in one of the passages of the lengthened valleys the Lord of the Mountains was dead. The men were all abroad and his widow alone in the hut. My servant Mudari told his story and claimed his surety and passport, which the Bhilni delivered in the shape of an arrow from the quiver of her late lord; and this arrow was as well recognised as the cumbrous scroll, with all its seals and appendages, of a traveller in Europe." Among the native officers of the Corps there are several of these Gometis. Their appointment is beneficial in every way, and points to a principle which one would like to see more extensively adopted in the officering of the native army in general. For mere smartness on parade and a knowledge of accounts &c., are not sufficient in this country to give a man that influence over his fellows which he must possess, to be able to lead and control them in critical situations.

To this very day a traveller attempting to traverse the country without an escort would be very unlikely to save his property from plunder, even if he himself escaped with a whole skin, for it is a point of honour with the Bhils to rob with violence and not by stealth. Every man carries a bow and a bundle of arrows, sometimes a sword also. The bow is made entirely of bamboo, the string even being formed from a thin strip of the bark. It may be called the national weapon, and with it the Bhil is very deadly at short ranges. At longer distances, however, it is curious to find that they are not so good. An officer now with the regiment used at one time to set up a target and challenge the passing Bhils to shoot; and to their great amazement he invariably beat them.

To proceed with any safety, it is necessary for a traveller to "square" the *Gometis* of the different *Páls* he passes through by paying the two taxes called *Bolai* and *Rakwalli*, the levying of which the Bhils regard as their indubitable right. The former provides for the safety of the travellers along the route, and the latter for the security of his camp at night. He is thus provided with a series of guards who escort him from village to village. These guards are only so in name, consisting perhaps of a single Bhil, or sometimes of a wretched urchin not half the size of the bow he carries. It is sufficient, however, to show the rest of the clan that the dues of blackmail have been satisfied. Should any of them be unmannerly enough to disregard the safe conduct, the whole *Pál* can be made, through the Durbar, to make good the damage done. But if the precaution of employing a local guard has been neglected, no claim for compensation is admitted by the authorities. The officers of the Corps even never leave Kherwara without having a guard of a Naik's party or so with their baggage. They themselves, however, may move freely about the country with very little fear of molestation. There is only one case on record of a *sahib* having been attacked; although during that drunken time of year the *Holi*, one's progress is frequently interrupted by the men and women, especially the latter, stopping up the road and clamouring for *bakhshish*.

It seems to be the general opinion that the Bhils are a small race of men, and that they are ugly and hardfeatured. Whether the description applies or not to those of the tribe inhabiting Malwa and Central

India, I am unable to say, but it is certainly a libel on the Meywar Bhils. That they are often of very black complexions may have something to say to the impression; but otherwise they do not appear to be either better or worse looking than other natives one meets. In height, although they certainly do not approach the Sikhs, or the Brahmins and Rajputs of the N. W. P., they average considerably more than Goorkhas do. In the Meywar Bhil Corps the minimum height for recruits is 5 feet 7 inches, and there are always several *umedwars* for each vacancy. The women are much fairer in complexion than the men, and as a rule have pleasant if not handsome features. They also seem to possess better physique than the men. This may be attributed to the fact that, when young, the girls who possess a certain market value obtain a larger share of food than their less fortunate brothers. Sixty local rupees* is the usual price a man has to pay for a girl he wishes to marry. Once married she becomes considerably more valuable, for the gay lover who takes a fancy to his neighbour's wife has on detection to pay Rs. 240 for the luxury. The same sum by the way is the penalty for murder.

Although as a rule slight in body, the Bhils are very hard and wiry. Their walking powers are proverbial, and it is no uncommon thing for a man in the regiment to start off after morning parade for his home, as much as 20 miles distant sometimes, and be back again in time for parade the next morning. On one occasion an old Havildar asked that he might be sent before the annual invaliding board, as he was getting old he said, and past his work. He was accordingly ordered into headquarters from Kotra, when he marched the whole distance, 57 miles, without a halt. On another occasion a man was sent with a box on his head to the railway station, 37 miles off. He delivered the box and was back with the railway receipt within 24 hours.

Of the religion of the Bhils, I don't think any one has ever gleaned any extensive information; but this may be due, as much as to anything else, to the fact that their own notion of the subject is extremely vague. They worship *Devi*, and *Hunuman*, and *Bhairoo*, the god of war, and believe in future punishment and reward. The former takes the form of "fire", as in some other beliefs, and by way of obtaining absolution for their sins or perhaps of accustoming themselves for the warm time to come, they are in the habit of branding their arms and legs in several places with a hot iron. Their only form of sacrifice is one to *Devi*, not propitiatory as one might think, but as a thank offering. When the occurrence of any particular event is desired, the Bhil vows to sacrifice a buffalo to the goddess. The event coming off, the sacrifice is duly performed, if not, not. In most ceremonies, christening, marriage, burial &c., the assistance of a *jogi* is called in, but he appears to exercise no influence over the people, being looked upon as merely a professional and necessary adjunct to the occasion. There are also of course numerous superstitions. If a man, when starting on any enterprise, should happen to come across a small black bird which is common in those parts, he will at once abandon his intention for the time being and return home. The magpie too is supposed to exercise great influence over human affairs, good or bad auguries being drawn according to the direction the bird is seen flying in. Most of the Hindu festivals are observed, and there are several local ones besides. On these occasions the Bhil never loses an opportunity of indulging in a regular drunken debauch enlivened by their inevitable dance which is performed as follows:—On the music, in the form of two or three drums, striking up, all the men present form themselves into a ring round the drummers, and keeping time to the drums proceed to move round and round the circle. The step is a short hop made on alternate legs. Each man is provided with a couple of sticks or perhaps a sword and a stick, and these be clashes alternately with those of the man in front of and behind him. All the time a sort of chant is kept up, breaking every now and then into wild yells and *kilkees*. The noise and excitement are tremendous. When a man is tired, he stands out and refreshes himsef with a draught of *Mohwa*. He then cuts in again, and shouts and skips with renewed vigour. In this way the dance never stops, but continues all night and often all the following day too.

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* One local rupee = about 12 annas Imperial money.

The formation of a corps from this tribe was first projected in 1827, but nothing definite was done till 1841, when Captain Hunter, assisted by two other British officers, commenced the recruiting of four companies with head quarters at Kherwara. In 1844 the strength of the Corps was increased to ten companies, seven of which were located at Kherwara. The remaining three were raised in the territories of the petty chiefs of *Ogna*, *Panarwa*, and *Jura*, and quartered at Kotra, which is in the heart of these states, and 57 miles north-east from Kherwara. In 1848 the Corps took part in an expedition to dislodge sundry gangs of Mina outlaws who had taken refuge in the hills.

Throughout the Mutiny, the Corps remained absolutely untainted; and certain bands of mutineers who attempted a passage through the country, experienced an exceedingly rough time of it at the hands of the Bhils. In 1861 the Corps was reduced to its present strength of eight companies, six at Kherwara and two permanently at Kotra. There is also a detachment of one company at Udaipur as an escort to the Resident of Meywar. The regiment is armed with the snider rifle and is supplied with an excellent eight section range. In the annual musketry course, although it has not been high up the list, it at all events has held its own with other regiments; which, considering the number of detachments and escorts that are supplied, is saying a good deal. In all matters connected with drill and training the system is the same as in other regiments. A General from the Bombay army makes an annual inspection, otherwise the Corps is under Bengal regulations, and receives all orders from the Agent to Governor-General, Rajputana. The Indian articles of war are not in force, and courts martial &c., are unknown, the Commandant having the power in either his civil or military capacity of disposing of all cases direct. Crime, however, is very rare.

There are five British officers in the Corps, and of these the Commandant, Adjutant, Wing Officer, and Medical Officer, are stationed at

Kherwara, while the 2nd in command resides at Kotra in charge of the detachment there. The Commandant is *ex-officio* 1st Assistant Resident Meywar, and Political Superintendent, Hilly Tracts, with the powers of a 1st class Magistrate. His salary, however, is the same as that of other commandants of native infantry, merely augmented by his drawing the "contingent" and "contract" allowances for the two wings. The 2nd in Command is *ex-officio* 2nd Assistant Resident Meywar, and as such receives Rs. 100 a month above his ordinary pay. Thus these officers, in addition to their regimental duties, have a considerable amount of political work besides. The Adjutant, assisted by the Wing Officer, combines the duties of Wing Commander, Adjutant, Quartermaster, and Station Staff Officer, and he may retain the appointment till he gets his "majority." I may mention that an officer joining a local corps is required to pay the usual mess donation, notwithstanding that he may already have paid one to a "Chief's" regiment. As the regiment is not given a band allowance, the only form of band maintained is one of drums, fifes, and bugles, with the last of which instruments the Bhil is an excellent performer.

The cantonment of Kherwara lies in the very midst of the Bhil country, owing its original selection as a station no doubt to the political advantages it possesses in being at a point near which the boundaries of three or four petty states meet each other. It is 50 miles south of Udaipur, and 106 north-east of Ahmedabad. The nearest outlet to the railway is viâ Rohera on the Bombay, Baroda, and Central India Railway, and distant 90 miles. A short time ago the road in this direction was the roughest of foot-paths and barely rideable. Latterly, however, from funds furnished by the Meywar Durbar, a fine broad road has been constructed by Colonel McRae, the present commandant of the corps. The town is picturesquely placed in a comparatively level valley, which although allotted its due share of hills, has the appearance of being more open than it really is from the superior height of the hills which encompass it on all sides. A fair sized stream holding water nearly all the year round runs along two sides of the station. Not many years ago a *bund* existed across the stream at the point where it first approaches the station, and transformed its waters into a small lake. The cantonment itself is well wooded while the somewhat arid appearance of the surrounding country is varied by frequent patches of cultivation, and numerous mango and *mohwa* trees dotted about. There are seven bungalows, including a travellers' bungalow and the station of the Church Mission Society, who have been in operation here and in the surrounding district during the last ten years. There is also a fair-sized bazar, post office, dispensary, and a small fort, the latter having been built as far back as 1827. A small and prettily constructed Church, built a few years ago from funds provided by the Bishop at that time, gives an appropriate finish to the secluded little station.

Within easy reaching distance of Kherwara very fair shooting is to be had. In the bigger hills there are bears, pig, sambhur, and chinkara. Panthers are found occasionally, but tigers very seldom, owing to the scarcity of water during the summer months. There are numerous tanks, however, which fill in the rains, and furnish during the winter excellent duck and snipe shooting to the few local sportsmen.

No Bhil Corps has ever been sent on active service; and it seems a pity that Government should not hitherto have attempted to utilize this numerous race of people, possessing as they do so many qualities calculated to make them good and valuable soldiers. The centuries of oppression they have suffered, and the contempt in which they have ever been held by the other Indian races with whom they have come in contact, cannot but have engendered within them a strong feeling of hate and distrust towards the authors of their misery. On the other hand, from the uniform kindness and protection, coupled with the impartial administration of justice, that they have met with at the hands of those British officers who have had to deal with them, their sentiments towards us can only be those of respect and attachment. Of their physical courage there can be no question. Leave alone the fact of the different corps having behaved creditably on such occasions as they have had to act, in quelling disturbances, capturing dakoits &c., the extreme readiness of the tribesmen to encounter each other in mortal combat, when bows and arrows and swords are freely used, is sufficient evidence of how reckless they are of personal danger. They are very amenable to discipline, as may be easily understood from their simplicity and ignorance, and from the unquestioning obedience with which they follow the directions of their own petty chiefs. They are inured from childhood to hardship and exposure, and this taken with their endurance of bodily fatigue and their walking capabilities to which I have alluded, renders them as fitted as any race in India to withstand the vicissitudes of campaigning.

It is sometimes affirmed that the Bhil is too much attached to his home to care about leaving it for any length of time, as he would be obliged to do if sent on service. But this I am confident is not the case: of course if the men were suddenly ordered without their having ever been out of their own country before to cross the seas, and proceed to, say the Soudan, they would naturally be scared at the idea, and probably desert in numbers. But if they were by degrees made accustomed to leaving their homes, and for longer and longer periods at a time, the result would be different. To start with, let them be sent to an annual camp of exercise, near at hand at first, say Nimach or Deesa; then further away, up in the Punjab. This will show them other troops, and create in them a wholesome spirit of emulation. In the matter of drill and discipline they would not be found wanting. After this preliminary course, send them to one of our petty frontier wars, and there is no reason why they should not acquit themselves creditably.

A very much stronger reason why the Bhils should be unwilling to leave their homes lies in the question of pay: at present a sepoy only gets seven local rupees or Rs. 5-8 imperial coinage a month. Without discussing the point here as to whether this is sufficient pay while active service is not required of the regiment, I will merely mention that the duties performed are at most as heavy as those of other regiments, for in addition to all ordinary guards and duties, there is a very considerable amount of detachment and escort duty to be done. But if service at a distance from their homes is demanded of the men, it would not only be fair but essentially necessary that they should be placed on the ordinary native infantry rate of pay, *i. e.* Rs. 7 per mensem. For the Bhil is a poor man, and cannot afford to leave his fields and soldier for soldiering's sake. His pay must be sufficient to compensate for the loss of his services at home.

The time has now come when new fields for the recruiting of our native army have to be found. Bengal, the N. W. P. and Oudh, and the Punjab, have in turn given their share of fighting men, and the supply of each has in turn either become exhausted, or has deteriorated from the effects of civilization. But in the Bhils we have a race upon whom there has been no drain, and whom the wave of civilization in its progress northward has barely reached, much less been able to demoralize. Wherefore wouldn't it be as well to "hark back" a bit, and see if any thing is to be made of them? A regiment fully armed and equipped is ready to hand. Try the experiment with them. If it fails we are no worse off then we were before. If it is successful, the advantage gained will be enormous.

REMARKS ON INDIAN AND RUSSIAN REGIMENTAL INTERIOR ECONOMY REGARDING FOLLOWERS.

By H. A. S.

The following extract is worth reading, as affording a glimpse of the other side of one of the many questions before us in India.

"* In a Russian regiment the commanding officer has to employ 2-3rds of the men for the carrying out of the internal economy of the regiment, and thus has not more than from 28—34 men in each company available for guards, parades &c.

"The fact of such a large number of men being employed in the regimental workshops &c., is very detrimental to the discipline of the regiment as a whole, as they become slack and more frequently give way to drunkenness.

"If all these workshops were done away with, there would be none of the petty emulation as regards details of dress, and the drill and training of the regiment would improve considerably."

Endeavours are repeatedly being made to make our soldiers, as it is called "self supporting", by diminishing what is known as the "Army of Followers." Our service tables shew the present scale to be very small compared to the scale in vogue only a few years ago, but these are still considered far too liberal by some. Here is a remonstrance from the only quarter in which a comparison will be of consequence. By their own shewing, we find a Russian battalion only capable of supplying 120 men for guards and drills in peace time, owing to the demands of their workshops and barrack duties. Thus a large proportion of these soldiers spend more of their time at tailoring, cobbling, cooking &c., than at military training. The more tailors and cobblers they have in the ranks the better for us. Let us hope that instead of 66% they will soon have 99% of such.

The above is a reminder to us, however, not to let our "reforms" in any way interfere with the first duty of a soldier in Asia, viz:—marching, entrenching, and shooting.

In the field, especially in Asia, away from civilization, a large number of each Russian battalion will be used up in "drawing of water and hewing of wood," to the detriment of their fighting qualities.

Every man thus employed is a rifle less in the fighting line, just as with us every man struck off our "List of Followers" means at least one rifle, frequently two, short in our firing line.

With the Russian army, this drain on the fighting men for "regimental employ" can be counterbalanced. Where one battalion would otherwise be sufficient, they send two. But we cannot play at that game, for we have not the same physical resources as regards numbers. We have to cherish every man who can hold a rifle. And notwithstanding the dictum contained in the soldier's pocket book, the more we here in Asia husband the strength and muscle of the trained exotic as well as the trained indigenous for the supreme moment, the better. Men who return to camp, tired after a morning's reconnaissance or scamper over the hills, will digest their food much better, if such is cooked by an experienced follower, than if obliged to sit down and cook the best way they can for themselves, perhaps with a night piquet or guard in view as well. Of course the food can be better cooked by a European cook, and the fact of his being a trained shot in addition will not interfere with his art, but the luxury of a European cook to stay in camp and prepare the men's dinners is hardly what is contemplated by those who desire to see cooks as followers abolished. Their aim theoretically is to have assuredly every soldier his own cook, and abolish followers of all kinds black or white. Badly cooked food, however, in time means impaired digestions. This means a large proportion of feeble and sick, filled hospitals, diminished fighting ranks.

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* Translated from the Svornik by Lieutenant A. T H. Newnham.

The all important aim before us is to keep every man we have well and sound, till the supreme moment arrives when his undamaged strength energy and skill will enable him to conquer three or four times the number of his enemies. *Every* other consideration must give way to this, even Financial Surplus' in times of peace.

The term "fighting followers", the new article often aimed at, is more of a paradox even than "Mounted Infantry" or "Sailor Brigade."

Occasionally sailors have done splendid service on *terra firma*. Mounted Infantry have in rare cases (as in Burma) been exactly the thing required, but "fighting follower" is more than paradoxical, it is a misconception.

The cook followers for instance should no more run the risk of a fight than the commissariat camel, for he is in fact no more than the last link in the commissariat chain, which places the food supply from where it was originally purchased, into the commissariat object point viz.—The Soldier's Stomach. For personal protection he may certainly be given a large table knife or a useful (for his work) hatchet, and if he is ever placed in a position where he can legitimately be called upon to do a little more than merely protect his life (such as for instance in any future Islandwana or Maiwand), anything more than a knife or hatchet will not influence the result.

Another important number of the "followers" will ever consist of doolie bearers. To arm these men with a rifle and ammunition, in hopes that thereby the fighting strength of the army be increased, is a common idea, but I think not generally in favor with our medical brethren. That the field hospitals in camp and on the march should have a permanent force of armed and trained men, to be emloyed on merely soldier's duties connected with the medical staff, such as sentries, orderlies, hospital guards &c., and under the command of the principal medical officer, is perhaps under present circumstances reasonable; but to give bearers and kahars the additional dead weight of 12 to 15 lbs. to carry, is certainly an unnecessary hardship to the men, with no benefit whatever to the army. The former plan might be a relief to the regulars, besides consolidating the medical department.

We have what the Russians have not got as yet, namely large numbers of docile, hard, devoted (if well paid) races, who make the best of all camp followers.*

These are cheaper and easier to procure and keep up than the fighting man, European or native. But it is strange that they should have fallen into such disrepute, and that if it were possible their total abolition should be a matter of days only. It is no doubt an unseemly sight to see a regiment on the march in India, but even now it is nevertheless a *soldierly* sight, for the practical utility underlying the unseemliness, is felt by the initiated to be real and tending to efficiency in the field. Appearances can be gratified not by abolition or curtailment but by improvement. With a serviceable khaki uniform and puggrie a proportion of hatchets or talwars, and a system of keeping the enlisted or attested followers *together* under some kind of supervision, the picture would improve to the eye. Certainly should every officer's sais, personal servant, and the company bhisties &c., have a distinct regimental uniform, harmonizing with that of the combatants.

But however dressed, their numbers should be adequate to the demands of camp service. No fighting man black or white should as a rule cook his own food. It makes him inefficient. To begin with every man has not the qualification to be a cook, such as patience and quiet energy, nor is the time required for cooking always available. The fighting man should in practice as well as in theory be "always ready." He cannot be so when preparing his meal, but can be so when it is prepared for him, and it can either be kept hot or taken to him as the case may be.

Cooks are essential, and these good of their sort, not expensive "*cordons bleu*", but men who have been thoroughly well trained to make a fire with damp wood, a *chula* in rock or mud, and a readily digested savory meal out of the hardest and coarsest army ration. Men physically capable of undergoing fatigues, men well clothed, well fed themselves, and well tented in the field. Men who are in a service which is fairly well paid, dismissal from which would be a severe punishment, and continuous good service would mean pension for life. Such a service the commissariat department could evoke in a short time.

A corps of regularly enrolled men, trained in some central school by the best culinary artist in India (Soyer was sent out at great expense to teach the men to cook in the Crimea), should form an integral part of our army with a head-quarters, say at Rawal Pindi, where the necessary reserve and recruits should be permanently stationed. This would form a nucleus of a depôt in time of war, and in times of peace could supply any limited urgent demand with speed. Regimental cooks in quarters should not be privately obtained. One of the first results of such a cook corps should be the introduction amongst the fighting native ranks of that excellent slightly leavened bread universally used in Persia, instead of that unleavened, frequently raw, indigestible stuff, known as the field chappatti. They would learn the best way to keep tinned *degchis* clean, and might possibly be entrusted with utensils made of "granite", light and durable, the *dasturi* on the tinman being made good to them in other ways. The advantage to the army would be great.

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* This term is used in its ordinary sense, but it is a misnomer. They should rather be called Field Orderlies or Bâtmen, or some new name coined. This term should be restricted to men who "follow" the troops (by permission) in their own interests only.

The individuals of such a corps need not be armed beyond a hatchet, or (a few possibly) a revolver, and should be an integral part of the commissariat supply department in quarters and in the field.

Some foresee the time when for every kind of warfare, certainly in Asia, there will be the same division of labor and duty there used to be in the classic days, when the fighting man had his armor bearer. Armor having now given way to powder and ball, it is believed that the solution of many difficulties, such as those connected with the supply of ammunition in the field, entrenching tools, transport, field ambulance, first aid to the wounded, good cooking, sanitation &c., will be found in giving *every file of fighting men* a well tented, carefully selected, and trained aide-de-camp. We could manage that now, if we chose, for it is merely a matter of transport, and transport is merely a matter of expense.

On this principle the reduction of kalassies with regiments was certainly a retrograde step. The one man per company previously allowed should have been retained in time of peace as a nucleus for the organisation of a valuable addition to each regiment on mobilization. Before taking the field, each company should have at once added to it 10 to 20 able bodied "field kalassies" to perform duties of a special, and important nature such as the following for instance:—

1*st*.—To care and account for the ammunition and the ammunition boxes, and see that they are carefully stowed away in camp protected by pawlins and ditch &c., &c.

2*nd*.—In proximity to the enemy to accompany the 1st and 2nd ammunition reserves, and assist towards rapidly and safely keeping these up with the column or fighting line, and at all times to take the place of "baggage men."

3*rd*.—To supply ammunition in action, to the fighting line.

4*th*.—To act as orderlies to commanding officers and adjutants and staff &c., in camp and on the line of march.

5*th*.—To be the first on the roster for any spade work, latrines, camp kitchens &c., &c.

6*th*.—To form the first body detailed for many kinds of fatigue duties.

7*th*.—On the line of march to assist those who "fall out" or are disabled, till handed over to the medical staff, carrying their arms &c., &c.

8*th*.—A portion to head the column on the march and act as pioneers.

9*th* —A new but important duty of at times to act as a physical reserve of flesh and blood, self portable and ever useful.

All such and similar duties are now performed by trained and expensively (comparatively) paid men, who hampered by their arms, perform the work less efficiently, and whose absence from the fighting line (under 2 and 3) might be a material loss. Such a body of "field reserve kalassies" entertained at short notice above market wages, to be dispensed with on returning to quarters, would require no pension &c., and would add materially to our fighting line at the cheapest of all charges.

They should be well clothed and tented, and remain unarmed. If the condition of the campaign admit of it, they might however be taught how to fire a rifle, and the rudiments of drill sufficient only to obey orders in action. They could then if desired, take the place of casualties in the field, and especially in action, when the chief losses in the infantry arm are not in material, but in the physical (man).

The arms and ammunition of men in hospital and of many of those killed would thus always remain with the battalion for use in the fighting line, nor would such weapons remain idle on the battle-field as they now invariably do.

This field kalassie squad would thus after a month become an efficient first field reserve of flesh and blood.

Mountain and field artillery would no doubt find such a body useful on the march, and probably of assistance in action.

To turn our fighting men into cooks, bhisties, and kalassies *á la Russe*, strikes one as giving the Russians a few points in the game with our eyes open and on easily avoidable grounds.

Can the cost of a few extra mules per battalion required for such a squad, and the few tons of grain they would devour, be seriously deemed a hindrance worth a moment's consideration, in times when money is of no value whatever compared to the momentous results at stake, and which could be certainly influenced by able bodied human beings willing and fairly capable of discharging a rifle ?

On such lines would we be using our resources in India to the utmost, in the most appropriate manner best suited to our resources, which are practically unlimited in food and in men of the kind above referred to ?

The supply of followers is as unlimited with us, as the supply of fighting men is unlimited with the Russians. The advantage we have is clearly, better trained men. By diminishing our followers we impair both advantages.

The question of followers requires reconsideration *ab ovo*, and the idea should be not in the direction of reduction or arming, but on the lines of firmer establishment, better training, better supervision, better clothing, and general improvement. The days when the "follower", even at camps of exercise, is not to be blanketted and tented, should belong to the past.

For the present let us take the lesson to heart of doing all we can to prevent our battalions in the field becoming attenuated by requirements menial and otherwise, which in this and neighbouring countries traditionally and legitimately belong to the "follower" of the various castes, to be procured without difficulty in those countries. If attenuated, then will our chances against even tailor-cobbling battalions be bad.

THE BURKUL TRAMWAY DURING THE LUSHAI EXPEDITION OF 1889-90.

By Captain du Moulin, Royal Sussex Regiment.

Burkul is situated on the river Kurnafuli, two marches above Rangamatti and five above Chittagong. During the expedition the troops and stores were despatched from Chittagong in flats towed by small steamers up to Rangamatti, beyond which steamers or large boats cannot pass. There the troops disembarked and the stores were unloaded.

From Rangamatti each cooly corps was sent on by road to Demagiri, but the troops and stores were despatched in boats up the river. The first halting place was at Soobalong, where a small stream, bearing that name, joins the Kurnafuli. The road was only a track cut through the jungle, fairly straight, but simply up hill and down hill the whole way. A camp was built for the coolies at Soobalong, but the troops slept in their boats a little further up the river, on the opposite bank.

The next camp on the road was at Burkul, where there is a small stockade guarded by a few Frontier Police, and after that came Shushi Basha and then Demagiri. The road, which was bad enough, and the hills, which were high enough, near Rangamatti, became worse as the road approached Demagiri, and it was probably for this reason that boat transport was employed.

At Burkul is a series of rapids, impassable for loaded boats and passable for empty boats only with great difficulty. These rapids extend for a distance of nearly two miles, their number, some seven or eight, reducing the level of the river to a great extent. In 1888 a road was cut along the right bank, in length a mile and three quarters, and considerably improved in 1889 before the stores began to come up. Materials for a tramway had been ordered from England, but were much delayed by the strikes in the London docks. Below the rapids sheds and godowns were built on the river bank at a place called Peshgiserra, and at the other end of the road, and above the rapids, more sheds and godowns were built, both to house the troops for the night and to protect the stores from the dew, which, at the end of the year, is very heavy. This spot eventually took to itself the name, Burkul, of the stockade across the river and was ever afterwards known by that name.

In November the tramway materials began to arrive, and the laying of the line along the road from Peshgiserra to Burkul was commenced. It was at that time intended to use the road for cart transport as well, and the tramway, therefore, was simply laid on the road, without any attempt being made to improve the sharp curves and heavy gradients which unfitted the road for railed traffic. Some of these curves were so sharp, that it was quite impossible for even an empty truck to go round them without running off the rails. It was only by dint of pushing and hauling at the critical movement, that empty trucks were got round the curves, and this difficulty was increased a hundredfold when the trucks were loaded with twenty maunds of stores.

In this length of 1¾ miles there were five very bad curves, where the trucks were regularly derailed, and three extremely bad gradients, up which it was only with the greatest difficulty and delay that each truck was passed by its crew of eight coolies. Afterwards, when the bullock carts were discharged, the line was improved a little, but the bad curves and heavy gradients already mentioned remained to the last, as it was impossible to reduce them without taking up the line and stopping the traffic.

On December 3rd the cooly corps of which I was in charge reached Burkul. At that time about a quarter of a mile of line had been laid, but a host of Bengali coolies were at work on it daily, and the line advanced rapidly. The trucks, which were lying at the river's edge, were hauled up the precipitous bank, dragged along the road, and placed on the rails, where they were immediately taken into use for the conveyance of stores and tramway material to the rail-head. There they were met by bullock carts, which conveyed the stores to Burkul above the rapids. The cooly corps assisted also in conveying tramway material along the line, and, as all hands worked hard and well, the line was completed throughout on December 12th. A great deal of work, however, had still to be done to the line, points and crossings laid, and a siding constructed at each end of the tramway, to facilitate the loading and unloading of the trucks.

The details of the tramway were as follows:—

Two miles of Howard's Patent Portable Railway, composed of Bessemer steel rails, weighing 21 lbs. to the yard; steel sleepers with keys to fasten rails, spaced three feet apart; four sets of points and crossings; and 25 wagons.

The rails were about 14 feet in length, one rail being easily carried by two coolies.

The sleepers were stamped out of sheet steel into a corrugated form, in order to give the greatest strength with the least weight of material, and at each end were cut slots to carry the rails. Where it was necessary to join rails, double sleepers, as shown in Fig. 1, were used. The rails were held firmly in their places by steel keys, driven in on the outside of the rail, which was then perfectly secure. When the keys were properly inserted on both rails, the proper gauge of 24 inches was accurately preserved, no bolts or rivets being necessary. If it was required to remove the line, the keys could be knocked out and the rails and sleepers taken up with but little trouble, and put together again wherever required.

The points and crossings were similar to those shown in Fig. 2, two sets being right-hand, and two left-hand. They were used at each end of the line to construct a siding where the trucks could be run into, whilst being loaded or unloaded. In their spare time the cooly corps commenced the construction of a half way siding or "pass-by," where full and empty trucks might pass each other, but had not time to complete it. What was finished, however, was found of great use.

The trucks were similar to that shown in Fig. 3, with a platform 5′ by 4′, the wheels being 12 inches in diameter. These wagons were very solidly constructed, and stood the rough usage they got uncommonly well. At first we had to use them without frames, as we had no time to have the frames fitted, but afterwards they proved to be very useful.

At the commencement there was a certain amount of difficulty in teaching the Punjabis how to work these trucks, and many were the accidents and collisions that occurred. The coolies would *not* see that on getting to the top of an incline, all hands should *not* let go and run screaming and yelling after the heavily laden truck going 20 miles an hour, with more trucks on the line in front of it. They would *not* understand that they should not sit on an empty truck and let it go, down hill, with a steep *khud* at the end. After some time, however, they learnt to be more careful, but for many days it was positively dangerous, when walking along the line, to turn a corner without first listening to hear whether a runaway wagon was not coming. Notwithstanding all this rough usage, the trucks kept in good working order, only one being damaged, and that one might have been repaired had any spare fittings been sent.

As a rule, the load on each truck was 20 maunds, and eight coolies were told off to each, four of whom pulled at a rope, the remainder pushing behind when coming to a curve. The truck had to be pushed and pulled at opposite corners, so as to turn it into the curve, otherwise the wheels would mount the rails and run off the line; the truck having then to be bodily lifted on to the rails again, or perhaps, unloaded, This derailment was of frequent occurrence. It is not too much to say that not a single journey was made without the wagon running off the rails, once at least. On an incline, the rope was shifted to the rear of the truck and all the coolies hung on to it, never being allowed to move quicker than a slow walk; if ever the truck moved faster than this, the coolies were overpowered and helpless to stop it (if the incline was a steep one), and then woe betide any wagon on the line in front.

The trucks were usually kept some distance apart on the line, and after a time the more intelligent of the coolies, notably the Pathans and Sikhs, learned the road and the parts of it where they had to be careful.

The quantity of stores that was loaded on each truck varied, but 20 maunds was usually the proper load. When the load was less than this, the number of men told off to each truck was reduced, but, as a rule, 2½ maunds were allowed to each man; thus, a load of 17½ maunds required 7 men; 15 maunds took 6 men. The spare men were utilised in other ways. When all the 25 trucks had full loads, the quantity carried was 500 maunds, and the number of men required to work the trucks was 200.

The stores were mostly in ½ maund bags: thus a wagon load of atta, rice, dhall, or gram, was 40 bags. Ghee, goor, and European rations, were in boxes of about the same weight, the same number going to a load. Other boxes and cases, such as hospital stores, telegraph boxes, and baggage, were loaded up to about 15 maunds only on each truck, so as not to make it top-heavy. Rum and lime juice kegs were carried on the bottom of the trucks, 12 small kegs or 6 large, with bags on the top of them. Sepoys' kit bags were carried 25 on a truck, ammunition 15 boxes to each truck, arm-chests and other regimental boxes about 15 maunds to a truck, whilst such other sundries as mule gear, chillies, gun-cotton, dried fish, and amchar were carried, on account of their bulk, about 12 maunds on a truck. Of the tramway material carried, 8 rails or 50 sleepers were a sufficient load. Trunks of trees and timber were also occasionally carried, whilst the return of the empty trucks was made use of for the transport of sick men, invalided to India, carried two on a truck. Twice a week also, the tramway was utilised for the transport of the Parcel Post, two trucks being sometimes required.

From 3rd December up to 31st January, 82,872 bags and boxes were run across by the tramway from Peshgiserra to Burkul. This gives an average of 1380 bags or 690 maunds daily. If, however, ten days, on which little or no work was done, are cut out, the average quantity moved daily amounts to 1656 bags or 828 maunds. For some time it was impossible to ship off anything approaching this quantity, owing to the desertion of many boatmen, and the result was that enormous mountains of stores accumulated at Burkul, above the rapids, which were added to daily by the arrival of more stores. Thus, the tramway was seldom taxed to its utmost, and it was not often necessary to move more than the average quantity, 700 or 800 maunds, although our orders were that, if required, 1000 maunds a day were to be brought across. Occasions *did* arise when *more* than this quantity had to be moved; thus, on the 19th December, 2977 bags, or 1488 maunds, were brought across, three trips instead of the usual two being made to Peshgiserra.

The great advantage of this tramway line may be seen from the following figures.

The original arrangement was 25 carts carrying 8 maunds each, or 200 maunds altogether; in two trips these carts would carry, for their day's work, 400 maunds.

Another proposal was that the cooly corps should carry the stores across: thus 400 coolies, carrying half a maund each, would in three trips carry 600 maunds. Three trips would be equivalent to 12 miles, and more could not be expected of them.

The tramway, however, with 25 trucks carrying 20 maunds each, could in two trips move 1000 maunds, and could, if necessary, by making another trip, increase this amount to a total of 1500 maunds.

			In two trips.	In three trips.
25	Carts	8 maunds each	400 mds.	
400	Coolies	½ ,, ,,	400 ,,	600 mds.
25	Wagons	20 ,, ,,	1000 ,,	1500 ,,

The cart drivers would not make more than two trips each, and there was, moreover, the chance of bullocks dying and of drivers going sick. A cooly corps numbered 500, but only 400 are here estimated, the balance being accounted for as sick, on other duty, sirdars, and mates. In addition, these 400 coolies could not be expected to do any other work after making their three trips. On the other hand, the tramway needed only 200 coolies to move 1000 maunds daily. The great objection was, of course, the cost; but a portable railway of this sort can easily be taken up and stored for use on a future occasion.

It was found that the best method of working the line was to have coolies stationed at each end of the road, with a number of trucks at each place; then, by both parties starting simultaneously each day and passing at a half way siding, which we constructed, no time was lost anywhere and regularity was ensured.

The actual way in which this was managed was by having 200 coolies and 12 trucks at Burkul, and 200 more coolies and the other 13 trucks at Peshgiserra. Of these numbers, 100 men at each place were told off solely to work the trucks backwards and forwards to the half way siding; the other 100 men at each place being required for various purposes: at Peshgiserra to carry the stores up the hill from the river bank and to load trucks; at Burkul to unload trucks and load boats.

Each party of men and wagons started daily at 8 A. M., those from Burkul with empty trucks, and those from Peshgiserra with loaded wagons, and proceeded to the half siding, where the men changed trucks and took them on to their respective destinations. On arrival at Burkul, the full wagons were immediately unloaded and returned to the half way siding, where the men waited for the arrival of another train of loaded trucks from Peshgiserra. This method was found to be the best plan, as there was no loss of time, the coolies knowing exactly what amount of work they had to do in moving 1000 maunds. When the men became accustomed to the work, it took them about four hours to move this quantity, but the work was certainly very hard in consequence of the badness of the line in many places.

In the meantime, the 100 men at Peshgiserra were not idle, as stores had to be carried about 200 yards up a very steep hill and placed in readiness for the return of the trucks empty; after the last trip the trucks were loaded, so as to be ready to start the next day.

In order to facilitate the loading of the large number of boats, which, in January, daily arrived at Burkul from Demagiri, a *ghat* was constructed of trunks of trees and bamboos, at which 12 or more boats, bows on, could be loaded simultaneously; and to save the coolies the constant ascent and descent of the preceptious bank, a "shoot" was built of railway material. This shoot, which was 101 feet in length, was made entirely of rails and sleepers, supported by logs of wood. The rails were first put together and then more rails were laid between them, end to end, the whole being supported on rough trestles. The top of this shoot was close to the terminus of the line, the bags being unloaded from the wagons and placed on the shoot, whence they slid, by their own weight, rapidly down to the boats below. No sides were necessary to the shoot, as the bags fitted slightly into the interstices between the rails. In order to throw off the bags at the foot of the shoot, a number of short lengths of rail were inserted at the end, so as to form an obtuse angle, which had the desired effect.

With the aid of the *ghat* and this shoot, we were enabled to load, daily, all the boats that were available. On the 3rd January, we loaded 3538 bags or 1769 maunds into 95 boats. The next greatest number was on the 12th January, when 53 boats were loaded with 3119 bags or 1560 maunds. It would have been quite impossible to do this amount of work, had it not been for the tramway.

Towards the end of my stay at Burkul, we were on several occasions enabled to unload the boats at Peshgiserra, rail the stores to Burkul, load up other boats, and despatch them all on the same day. Without the tramway this would have been impracticable.

THE STORM OF GEOK-TEPE, AS DESCRIBED BY AN EYE-WITNESS.

Translated from the Russian by Captain JONES, 23rd Pioneers.

12th January 1881.—A dull gloomy morning. At 6 o'clock a drizzling rain was falling, and everything was damp and clammy. The men had risen early and were dressing with great care, all being anxious to have clean white blouses. Many of them had kept a spare one; but others had only an old and torn, but well washed one, for the occasion. A few came to the Red Cross Society's stores praying for a blouse on loan, and as many were given out as could be spared.

The faces of all were gay and lively, but the eyes seemed to have a serious expression in them, as if in expectation of something unusual.

In the Apsheron battalion the feeling of suspense became every moment more intense. This was the battalion which had been so unfortunate, and had suffered so severely when it had lost its standard. The honour of leading the storming column on the left flank had been now reserved for it. The war traditions of the battalion would if possible on this day be enriched by a new and glorious exploit, through which, it may be, their lost flag would be regained. Let it wave if necessary over their graves, but wave it should, earned as it would be by a brilliant page of their history. Such was the meaning conveyed in the glistening eyes of the men, and which also found expression in their short, abrupt, manner of speech, "God grant that we may win and then die; the misfortunes of the dead are not remembered long."

"Ah yes, my brothers; if we only get our flag again, I don't care much myself about living any longer."

This excited expectant tone was not so marked in the company of volunteer scouts. These hardy dare-devils thought so little of life or death, that the various chances and changes of a warlike life seemed their ordinary existence. They were jesting and joking as usual, but Voropanoff their commander was somewhat thoughtful, as he with his company was to lead the assault of the breach on the right flank.

Eight o'clock.—In the distance on the extreme left flank one heard the sound of artillery and the crackling of musketry.

The ball had opened. Several of the soldiers took off their caps and crossed themselves.

Haideroff's column attacked the Melnich village. After the artillery had breached the front wall and driven the enemy out, it was quickly occupied by our troops, and placed in a good state of defence as rapidly as possible. A large number of the enemy had collected on the wall of the fortress opposite Melnich, and opened a heavy fire on the village. At the same time some of the enemy's cavalry, moving along the western face, also attacked the position on one flank. Four guns opened with shrapnel on this cavalry, and against the enemy on the wall, and another four guns flanked the approaches to the village, and fired against the southern face of the fortress.

The growling of the artillery was heard along the line, and fire which continued from 8 o'clock till 11 was again opened on the breach. The firing and noise of the breaching batteries and other guns was incessant. The Tekkes boldly threw themselves into the breach in the endeavour to close it, but were driven back by shrapnel fire. Adjutant Ootkevich behaved with great gallantry. Everything was shrouded in smoke, and fragments of shells and hand grenades were constantly flying backwards into the trenches.

General Skobeleff, sitting in a camp chair in front of the Stavropol redoubt (No. 3), was watching the attack. The Staff implored him to be careful. Bullets were falling all round, but the general seemed to hear nothing, and to be entirely absorbed in watching the progress of the fight.

Eleven o'clock.—General Skobeleff sent for Grodekoff, the Chief of the Staff, and issued orders to fire the mines at once. In a few minutes Grodekoff had joined Colonel Kuropatkin near the Grand-Duke position, and sending for Captain Masloff, who was in charge of the mining operations, said, at the same time showing him his watch, "By order of the commander of the force the mine will be fired at at 20 minutes past eleven."

"Very good sir," and Masloff, having compared his watch, hurried off to the shaft.

Colonel Kuropatkin, to avoid any accidents which might possibly occur from the falling of the walls in the village, through the vibration caused by the explosion of the mine, ordered all the troops to be withdrawn from it, and to form up on the place of assembly which had been prepared beforehand in rear of the redoubt.

The troops assembled, and Kuropatkin divided his column into three parts.

The first.—Under Major Sevenius, and led by Voropanoff's scouts, was to storm the breach and proceed along the wall on its left, until they met with Colonel Koselkoff, and to the right, up to the first retrenchment of the enemy.

The second.—Under Staff Captain Fuchs, would form a reserve to the first, and after the capture of the breach would proceed onward into the interior of the work.

The third.—Under Lieut.-Colonel Gulieff, formed the main reserve, and after the explosion would occupy the Shervan and Sapper redoubts, the Turkestan village, and the advanced trench, thus supporting the main body and right flank of the storming column, and also acting as its main reserve.

A short time elapsed. The earth trembled. A dull subterranean noise, and then a gigantic sheaf of earth, stones, and mud rose high into the air, bearing with it a part of the wall of the fortress, and leaving a wide and easily ascended breach, as the result of the explosion.

The artillery, silent for a moment, again opened a heavy fire, and a mass of iron was hurled against the northern face of the fortress. Loud fierce cries of "Hurrah" rose into the air and mingled with the din.

Amidst the thick clouds of smoke and dust lying along the ground near the breach, dusky figures were now and then to be distinguished stealing along towards the fort; these were Voropanoff's scouts, more than half of whom were overwhelmed and crushed by the falling earth with other volunteers from the Shervan battalion, and the Sappers with Captain Masloff at their head. All rushed for the breach under a hail of lead from the Tekkes, who had crowded to defend the passage where the explosion had taken place. The enemy fought stubbornly and well, breast to breast, bayonets, spears, and sabres being freely used on both sides. Almost the first man killed was Ensign Moretz of the Trans-Caspian local battalion, who had been sent to the front by the General to expiate some slight neglect of duty; by gaining a white cross (Saint George), or a wooden one. His breathless body fell against Voropanoff. The latter was knocked off his feet, and thus accidentally escaped a sword-cut made at him, which only expended itself on the empty air, but a few seconds after the same Tekke again attacked him, and cut him down with a sabre cut on the head. The men were greatly infuriated and began to use their butt-ends freely. Some of the Oural regiment forming part of the reserve, advanced to the assistance of the stormers, and together they carried the breach on their own initiative. The defenders were driven back, but those holding some parts of the walls fought fiercely and doggedly, until at length they also were all killed and exterminated.

Lieutenant Bulegin stormed the enemy's retrenchment. The men spread along the walls on both sides of the breach, driving back step by step their infuriated and stubborn foe. Captain Masloff and his sappers soon put the breach in a state of defence, but not before Captain Fuchs with a part of his column had pushed on into the interior of the fortress. The struggle still continued among the kibitkas. The Tekkes fought like lions, but the troops never yielded a foot, and the whole place was covered with dead bodies. Women dragging their children with them were running about like lunatics from one kibitka to another, and in and out of their underground dwellings. Sobs, tears, cries, groans, the echoes of artillery, and of musketry volleys, were mingled up together in a mad chaos, where men were wandering about like ravenous beasts.

The enemy at length wavered: part fled by the gate in the northern face of the work, and from thence into the desert, but others continued to fight on most determinedly to the end. Kuropatkin's and Koselkoff's columns met, and then the troops with flags flying, drums beating, and bands playing, stormed the hill together.—Still another struggle, and at last, the tactical key of the fortress, the hill of Denghil Tepe, was occupied by our victorious soldiery.

At one o'clock in the afternoon the flag of the Shervan battalion was planted on it, to be soon after replaced by the Imperial Standard.

The enemy seized with a panic fled in a body into the desert, and resistance no longer continued. The infantry pursued, and were quickly joined by the cavalry under Prince Erestoff. Their road to a distance of 7 versts was covered with the enemy's dead bodies.

At the moment when the mine exploded, the storming party on the left flank, headed by the 4th battalion of the Apsheron regiment with scaling ladders, advanced rapidly towards the breach under a murderous fire from the walls. The 4th battalion had as yet scarcely crossed the little bridge over the stream, when its commander, Count Orloff-Denesoff, was severely wounded in the thigh with a fracture of the bone. He had continued leading his men notwithstanding a previous wound in the hand. Almost at the same time, to the left of Orloff, Midshipman Mayer had fallen dangerously wounded. Both the wounded were quickly picked up by the stretcher bearers, and the command of the battalion devolved on Major the Khan of Nakichevan, who impetuously pushed forward with his men up the difficult ascent of the breach made by the artillery. The scaling ladders were brought up. The enemy fired at point blank range, at the same time hurling down huge rocks and stones. The moment at length arrived when the antagonists were only divided by the thickness of the wall. The heads on both sides were hidden, but spears and swords glistened on the further side. This lasted a few seconds when........................ ......"Forward, my brothers, we can only die", was shouted in a loud voice. Lieutenant Chukmasoff, the Khan of Nakichevan, and Captain Melnitz, with the leading files of the troops, appeared on the top of the wall. Ensign Popoff, who at first had run to help his wounded father, the commander of the 3rd Apsheron battalion, also ascended with them. The 3rd battalion had advanced to the aid of the 4th battalion, which was already somewhat disordered. Lieut.-Colonel Popoff succeeded in getting as far as the ditch, where he was severely wounded in the head, but on seeing his son rushing towards him, the old man although covered with blood, pointed silently towards the breach and fell back insensible. The younger Popoff instantly turned back towards the fortress. Clinging on to the wall and helped up by those behind, the Apsheron men quickly reached the summit. At the same time the Sappers, under the command of Captain Vassilieff, who throughout the assault had headed the storming party, were busily widening the breach and making it easier of ascent. Part of the Apsheron battalion, driving back the enemy, spread along the walls, and another portion descended into the interior of the fortress, where they joined in the general mêlée among the kibitkas. The remainder of the column arrived soon after, and meeting Kuropatkin's column, advanced with it.

As soon as possible after the explosion, Lieut.-Colonel Haideroff at Melnich village, advanced to the attack, directing a part of his column against the western face in the endeavour to carry it by escalade; the other portion, moving between the Opornie rivulet and the fortress, attacked the enemy's position; and the cavalry received orders to follow up the flying Turkomans. The first party, having escaladed the wall, joined the troops under Kuropatkin and Koselkoff. Geok-Tepe had fallen.

Our loss was;—killed, 4 Officers and 55 Rank and File—Wounded, 18 Officers and 236 Rank and File—Contused, 10 Officers and 75 Rank and File. The scouts who were crushed by the falling earth were picked up, and nearly all recovered.

The enemy lost 4000 killed inside the fort, and about 2000 during the pursuit.

MODERN BOBADILISM, OR THE MARKSMAN'S METHOD OF DEFEATING AN ARMY.

By Captain JAMES CHESTER, U. S. A., Third Artillery.

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CAPTAIN BOBADIL was a creation of rare Ben Jonson. He was a coward, a knave, and a braggart of the Ancient Pistol order, and like him pretended to be a soldier, a hero, and a philanthropist. He had a theory, based upon his own personal prowess, which was calculated to diminish the horrors of war and greatly curtail its cost. He never doubted the basis upon which his theory was built, nor lost an opportunity of advertising its excellence. Fighting was a mere pastime to him, and he declared his readiness to undertake that disagreeable duty for the State upon the easiest kind of terms. Bobadil was a reformer, and his speciality was the Art of War. He proposed to reform that Art in a way that would reduce the disagreeable features of fighting to their lowest terms, and his plan for doing so became known to the world as "*Captain Bobadil's Method of Defeating an Army.*"

Bobadil enunciates his plan thus: "I will tell you, sir, by way of private and under seal; I am a gentleman and live here obscure and to myself, but were I known to Her Majesty and the lords,—observe me,—I would undertake, upon this poor head and life, for the public benefit of the State, not only to spare the entire lives of her subjects in general, but to save the one-half, nay three parts of her yearly charge in holding war, and against what enemy soever. And how would I do it, think you?

"Why thus, sir. I would select nineteen more, to myself throughout the land; gentlemen they should be of good spirit, strong, and able constitution; I would choose them by an instinct, a character that I have; and I would teach these nineteen the special rules, as your punto, your reverso, your stoccata, your imbroccato, your passada, your montanto; till they could all play very near, or altogether as well as myself. This done, say the enemy were forty thousand strong, we twenty would come into the field the tenth of March or thereabouts; and we would challenge twenty of the enemy; they could not in their honor refuse us. Well, we would kill them; challenge twenty more, kill them; twenty more, kill them; twenty more, kill them too; and thus would we kill every man his twenty a day, that's twenty score; twenty score, that's two hundred (*sic*), two hundred a day, five days a thousand; forty thousand, forty times five, five times forty, two hundred days kills them by all computation. And this will I venture my poor gentleman-like carcass to perform, provided there be no treason practiced upon us, by fair and discreet manhood; that is, civilly by the sword."

That there are flaws in this plan is frankly admitted; probably Bobadil is the only man that ever denied it. Still there was some plausibility in it, in an age when the wager of battle was a recognized method of determining questions of fact. Disputes between individuals were settled in this way, and why not disputes between states? Why should a powerful state be permitted to overwhelm a weak one? If they must fight, let them select their champions, fight according to rule, and abide by the issue. There seems to be plausibility in that, too, which in Bobadil's day, must have looked like the eternal truth itself. Indeed the wager of battle was almost an every-day occurrence in those days. We have a very fine description of one from the pen of Walter Scott. He says that the Clan Chattan and the Clan Kay had been at feud for many generations. To quench the feud, and settle the question of clan superiority, a certain number of men from each clan agreed to meet in mortal combat on the Inch of Perth. The battle was fought in presence of the king with all the solemnity of a legal proceeding, and at its close judgment was pronounced. But it settled nothing. The judgment was ignored by the losing side, and the feud went on more bitterly than ever. So Bobadilism, even in those ancient days, failed in practice.

But failure in practice rarely kills the theory of a crank. Bobadilism, with all its essential ear-marks, has reappeared. It is not so conspicuous, perhaps, as it once was, but it is young yet, and too modest to be aggressive. It is content for the present to wear the honors and fatten upon the flattery awarded it; but it is Bobadilism for all that, and may formulate a theory any day.

When the modern Bobadil lays his plan before the public, he will be found to have the same purpose as his prototype. He will propose to simplify the art and lessen the horrors of war in a scientific way. The cost and the carnage of battle will, of course, remain. Blood will be shed, and money will be spent more lavishly than ever; but the killing will be done in a scientific manner by the skillful manipulation of arms of precision at distances beyond the range of distinct vision. It is the shock of battle, the delirium and turmoil of colliding masses, which brutalize a battle-field, that the modern Bobadil will propose to eliminate. Battles, according to his theory, will be decided without shock. Battalions and companies will no longer be units on the line. They will be retained for administrative purposes only. The line of battle will consist of a line of men in easy open order, and the battle will be a contest in marksmanship. Commanders on both sides will stake the issue on the marksmanship of their men. Manœuvring will be unnecessary, and generalship will be eliminated from the art. Hostile lines approach each other until they are within effective range. The men will then lie down, taking the prone or back position, or the "Texas Grip," as each individual may elect, and the battle will begin and proceed like a contest at Creedmoor, minus the markers and scorers. Officers will have little or nothing to do in such a contest, except to attend to supply, and see to the dead and wounded. A battle will thus become in fact, what it has always been in popular conception, a contest in killing. If both sides are equally skillful and courageous, the end may be mutual annihilation. In any case the battle must be tedious and monotonous, but it will be a trial of skill and not an exhibition of ferocity.

The battle according to the new theory must continue until one army is annihilated or "throws up the sponge." It is difficult to conceive how it could be terminated otherwise without resorting to the shock, or invoking the action of an umpire; but with such a functionary and a perfect set of rules, the battle might be terminated after, say, a week's practice. Correct lists of killed and wounded might be kept by disinterested parties, and at the end of the battle a balance might be struck and the victory awarded accordingly; or the losing army might be annihilated, in a certain number of days, by computation. Of course there might be an appeal from such a decision, in which case the only alternative would be a continuation of the contest, until one army was actually annihilated, as in the case of a cocking-main. Indeed this would be the natural termination of such a contest, although the intervention of an umpire at the end of a fixed period would be more in accordance with civilization, not to mention humanity.

Ancient Bobadilism was the offspring of individualism. It was the natural consequence of the spirit developed in the jousts and tournaments of chivalry. The knights of chivalry are the prototypes of the marksmen of to-day, and the lists of old are the counterparts of our rifle-ranges. Distinguished champions of the olden time travelled from tournament to tournament prepared to fight with any qualified champion who might enter the lists against them, and in this way earned abundant fame and a scanty livelihood.

Modern Bobadilism is very like its prototype. Sprouting from the same seed, it has been fostered by the same kind of favor, and stimulated by the same kind of reward. Perhaps it deserves the laurels which it wears with becoming modesty. We have no fault to find with the laurels *per se*. But the lesson which they teach, the spirit of individualism which they foster, must be ruinous to discipline and destructive of that plastic coherence, without which any army must be unmanageable. Individualism is the enemy of discipline, and the antidote of organization. It recognizes no merit in combination, and no science in war. The art of rifle shooting is the Art of War in its estimation. It believes that an army of marksmen would be invincible; that cavalry and artillery are unnecessary adjuncts to an army; and that strategy and tactics are old-fashioned fads. And there is no telling how soon it may formulate a theory founded upon these ideas. It believes with ancient Bobadil, that war is simply a contest in killing between two nations, and that victory belongs to him who kills the most. And these assumptions are all the more dangerous because they harmonize with popular belief. It is the marksman and not the soldier whom the nation delights to honor. Perhaps it thinks the marksman's badge is evidence that the wearer is a soldier tried and true. Perhaps it would be heresy to think otherwise. Still there is something Pickwickian about the marksman's badge. If it were not Pickwickian it would be unlovely. The soldier who cut a notch in his gun-stock every time he killed an enemy, has never been considered a lovely character. Yet these notches were evidence of genuine marksmanship. There was nothing Pickwickian about him. He was a military marksman pure and simple, and he has always been classed with his brother barbarian, who vouched his skill by the scalps of his victims. Strange, is it not? The sham marksman is decorated, the real one is detested.

Again, the pot-hunting proclivities which individual marksmanship tends to develop in the soldier, are worthless in war. "All quiet along the Potomac to-night," was a true report, although a lonely picket had just been murdered by a pot-hunting enemy. The war was no nearer its end for that solitary death, nor would it have been if ten thousand sentinels had so fallen. Such barbarism only arouses the savage which sleeps in the heart of every soldier, and tends to prolong a war and make it bloodier. Good soldiers are not pot-hunters. The rebel picket who presented arms to General Grant at Chattanooga was not a pot-hunter. The savage was sound asleep in his heart, so sound that all the turmoil of lawful war had been unable to awake him.

There never were better soldiers, or more bitter enemies arrayed against each other, than the French and English in the Spanish Peninsula in 1813. They had been fighting each other in that theatre for over five years, and some of their battles were the bloodiest, even of that bloody age. But there was no pot-hunting. Cold-blooded military murder was never resorted to. The soldiers respected their enemies. In this connection some interesting anecdotes are related. Napier, in his xxiii. book, states that while the 43d Regiment was preparing to advance, a French sentry within twenty yards coolly walked his beat in perfect confidence as to his personal safety. Indeed he was so satisfied of his safety that he removed his knapsack to ease his shoulders. And his confidence was not misplaced. When the regiment was ready to advance, an English soldier stepped forward and helped him to replace his pack, so that he might get out of the way before the firing began. On another occasion when Lord Wellington desired to drive the French from a certain hill in the neighborhood of Bayonne, he sent the riflemen who constituted his escort to take possession, which they accomplished in the following manner. Stealing up to within very short range of the position, one of the old soldiers raised the butt of his rifle and tapped it several times. At the signal, which seemed to be well understood, the French withdrew without firing a shot. The signal meant: "We are strong enough to take this position, and we must have it." And, the historian adds: "The signal would never have been made if the post had been one capable of permanent defense, so well do veterans understand war and its proprieties."

Now, modern Bobadilism is calculated and intended to abolish all these proprieties. It tends to arouse the sleeping savage in every soldier's breast, and civilization will have to suffer for it. Individualism in the ranks is the most dangerous element that could be introduced into modern war. It is inconsistent with discipline and detrimental to efficiency, and would convert any army into an armed mob;—unless indeed the old-time "wager of battle" is to be revived, and national disputes are to be settled in the old-fashioned way, by chosen champions. Then, indeed, modern Bobadilism would find its field of action. Not only would it lessen the horrors of war, but it might be made to abolish bloodshed altogether. If the ancient Bobadil could kill his enemies by computation, the modern Bobadil might destroy his by demonstration—a method which could not be objectionable even to the most advanced peace-at-any-price Quaker societies. Suppose, for instance, a dispute arose between two nations, which, according to the old methods of procedure, would have to be settled by the sword. According to the modern method, each side might select an umpire, and the two thus selected should agree upon a third. To the committee thus formed, the score-books of a hundred, or a thousand, *bonâ fide* marksmen of each side might be referred, and after balancing them up, the committee should decide the issue. Then, indeed, Bobadilism would be beneficial. There would be no bloodshed, no camp disease, no boiling of the haversack for soup. The horrors of war would be altogether abolished, strategy would become a lost art, tactics would be forgotten, and war would become a bureaucratic business altogether. Then, perhaps, the millennium would begin.

But the world is hardly ripe for the millennium yet. When a warlike nation gets thoroughly aroused, nothing will satisfy it but blood. Bobadilism on the demonstration plan would yield no satisfaction. The cocking-main method would be more in accord with such a nation's humor, and all the evils of individualism would thus blossom on the battle-field. Modern Bobadilism believes that battles can be won by individual marksmanship, and the belief is likely to affect the tactics of battle in the near future. We are entering on an era of soldier's battles, in which the Art of War will be superseded by the art of rifle shooting, and battles will be won by the accidental efforts of the men in the ranks.

If that be true, surely the American Bobadil ought to rejoice. We have an army of marksmen, and if Bobadil's theory be right, we ought to be invincible. But there is a horrible possibility behind that word "if," which it takes some courage to enunciate. Let us look at the pros and cons of the matter. Bobadil says the modern musket is a grand weapon, and it certainly is. He says it has immense range and extraordinary accuracy, and it certainly has. He says that a marksman armed with such a musket can hit his mark twice out of three times at six hundred yards, and he certainly can. And he says that no line could live before such men, and such muskets. Well, perhaps; but that assertion is not so well supported as the others. It overlooks some very important elements in the problem. Excitement, rashness, nervousness, weakness, timidity, and even cowardice are liable to be developed, even in marksmen, by the hardships which precede, and the dangers which attend line of battle work. How are we to estimate the value of these factors, some of which are sure to be present. It would be madness to expect the calmness and deliberation of the rifle range on the line of battle. Marksmen are not exempt from any of the weaknesses of human nature. What modulus then shall we use to reduce the work of the range to the work of the battle-field? In other words, what is the battle-value of individual marksmanship?

The question is more easily asked than answered. No battle has yet been won in that way, except skirmishes with Indians and uncivilized tribes, which hardly deserve the name of battles. There really are no data upon which an answer can be based. The answer which jumps so readily from the lips of the enthusiast is purely theoretical and wholly unreliable.

There is, perhaps, little danger that the veteran soldier, with the roar and smoke and turmoil of battle still seething in his memory, will ever concede a fictitious battle value to individual marksmanship. The paraphernalia of the rifle range are simply absurdities to him. He would never concede that the fighting qualities of a battalion are increased by the addition of a wind adjustment to the musket sights. Indeed the sight itself is of small value in line of battle work. Of course the sight and its adjuncts are valuable in certain kinds of work, just as the marksman is; but for purely line of battle work they are out of place. Veterans will readily admit this, but the veterans of our Army are rapidly stepping off the stage. In a few years they will be gone, and the younger soldiers that remain, trained as they have been to believe in all the heresies of the rifle-range, may be led to put a fictitious estimate upon the battle value of individual marksmanship. For their sakes then, let us in all seriousness inquire what that value really is.

In order that the question may be presented, reduced to its lowest terms, it is proper to state here, that outpost duty, skirmishing, foraging, and all small detachment work, are not under consideration. The question proposed contemplates line of battle work alone. There is no question, that, on the skirmish line, or any of the duties just mentioned, the markman has an immense advantage over the poor shot. For that reason, only marksmen should be sent on such duties. The German Schutzenzug and the light companies of our old battalion organization, are the answers of experience on this point.

Still it is possible to exaggerate the skirmishing value of a line of marksmen. It will drive in the enemy's skirmishers more rapidly, and perhaps disable a greater percentage of them, than a skirmish line of line of battle soldiers, but the only practical effect of all that would be, to bring on the battle a few minutes earlier. And that is not always an advantage. If the ground is rough or wooded, a too rapid advance of the skirmish line might be dangerous. Still the skirmishers should be marksmen, even if they have to be restrained in their advance.

But it is the line of battle to which our question refers. Let us look at it going into action. Every veteran has many fine examples stowed away in his memory. They are all different, and yet they are all alike. Although each may have its own peculiarities, all have a multitude of features exactly alike. Let us reproduce the familiar picture.

There is the army, or that small portion of it which we can see, tired, haggard, and dirty. The "gay and gallant tread" is not there to any great extent. The tinsel of the uniforms is tarnished, trousers are tattered, and many naked toes are peeping through the rents in contract shoes. The men have been poorly fed for days, and show it. Their digestions are impaired and their bowels rebellious. Last night they slept without their blankets—too tired, perhaps, to unroll them—and to-day they have abandoned them as an incumbrance. Some of them think they will never need them more. They know there is a battle ahead, and if they live to hear tattoo they may be able to pick up a blanket. They are almost played out, and half glad that the agony is so nearly over. Better be killed they think than die of diarrhœa, and they brighten up a bit in view of the chances for the former alternative. Now these are not first-class conditions for making bulls'-eyes. Will any one pronounce them over-drawn?

They are in line at last. Skirmishers are thrown out, and the word is "Forward." This looks like business. The sun comes out, scorching hot, and converts their muddy uniforms into a kind of terra cotta covering. Onward they go, dragging their heavy feet through swamps and thickets, over dykes and ditches. Their canteens are empty—they have been marching since dawn--and their mouths are as dry as lime-kilns. Is it any wonder that they become impatient, irritable, and cross? Then their rate of progress is disheartening. They make so many halts without apparent necessity, and always halt at places where there is no fence to lean against, and nothing to sit down on. Then they see no signs of an enemy, and bets are offered that there are none within a dozen miles. And so they grumble as they stumble onwards, at odds with everything and everybody.

But hark! A rattle of musketry in front, and the batteries open on both sides. Still no enemy is visible, not even the batteries that make such a racket. But a cloud seems to have been lifted from the line, and faces brighten up. There are none but brave men in the ranks. The cowards were absent at reveille, and the faint-hearted have fallen out from time to time, in obedience to convenient calls of nature. There is a strange sympathy between a man's spirit and his bowels. These calls are all genuine. There is no shamming: but many fail to return until after the fight.

The advance continues through woods and chapparal, and over occasional clearings. The music of battle seems nearer, but nothing is seen. Even their own skirmishers are invisible. They are lying in the outer edge of the brush, some two hundred yards ahead, and firing very industriously. Do they see the enemy? No; but they know he is there. They are firing at the little puffs of smoke which are being emitted from the brush on the opposite side of the clearing. The hostile skirmishers are there. The hostile line is a little way beyond, concealed behind some ridge, or fold in the ground. It will remain concealed until it opens its fire in earnest. Meantime the hostile skirmish-fire increases in volume, and becomes continuous and galling. They have been reinforced and are trying to unmask the advancing line.

A halt is made in the timber. Canteens are filled at the muddy little brook near by, and the last cracker of the day's ration is eaten.

The attacking skirmish line is re-enforced, and the firing sounds almost like a battle. Still nothing is seen of either line but the smoke, now so thick that individual puffs are hard to see. But the hostile batteries—or some of them—can now be seen through the trees, enveloped in a sulphurous cloud, in which the lightning seems to play, and weird-like shadows dance about like demons in their native element.

The weary line rests for an hour; and such a rest. The hostile batteries have found it out; at least they suspect its presence there, and shower the bit of timber with their shells, and the resting line gets restive and ill at ease. No situation is better calculated to try a soldier's nerve and test his character. If his individuality has been fostered in his training, he will fret and fume, and call his colonel names. There is not a marksman in the line but feels that he is being sacrificed. He objects to being shot down like a dog tied to a stake. If he were with the skirmishers, he thinks he could at least shoot back, and with effect, if the rifle-range gives any indication of skill; and the chances are that he will steal away to try. Thus many a brave soldier justifies to himself the crime of quitting the ranks. His individuality is stronger than his discipline, and his training is to blame for the result. If there be many such men in a battalion disintegration is inevitable before a blow can be struck.

The disciplined soldier feels and acts differently. Like his friend the marksman he has no love for the situation. He sees its dangers just as distinctly as the others do, and cannot comprehend why the battalion remains there, any better. But his training helps him to bear it. He has been taught neither to think nor to act without command. His individuality has been suppressed, and he has accepted the rôle of the small wheel in a complicated mechanism. His functions are not intellectual, and he is glad of it. He is willing that his captain should do the thinking for him on occasions like this, so he sticks to the ranks, uncomfortable, perhaps, but not miserable, and ready to obey. Such a man is a disciplined soldier, and every company is valuable or worthless according to the number of such men it can count in its ranks. But we must get that battalion through the battle.

The afternoon is now well advanced. The hostile guns have sought some other target, and the wisdom of standing fast becomes apparent. The artillery battle has progressed, judging by the sound, and the hostile fire has slackened somewhat. And now a fearful cannonade begins. Every friendly gun has found a tongue, and shells from everywhere are bursting in front of the resting battalion. The woods catch fire, that is the leaves, and here and there the underbrush, and smoke accumulates and hides the landscape, front and rear. Night seems to have settled on the field.

And now the line moves forward through the smoke and the hostile skirmishers increase their fire to a maximum for a few moments, and then scamper off, a goodly number dropping by the way. The skirmishers of the advancing line rejoin their companies, when they reach the skirmishers' position, and as the line emerges from the timber, it encounters a hot artillery fire. Onward it goes, however, across the clearing regardless of shot and shell, and plunges madly into and through the second belt of brush. Losses are heavy now, for the hostile batteries recognize in the advance a main attack, but no reply is made. The advance is a scramble through the brush. Presently a second clearing is reached, and as the line emerges from the brush it meets a withering blast of musketry, which discloses for the first time the exact position of the hostile line. It lies along a ridge, perhaps three hundred yards away, concealed behind the crest which serves it as a breastwork. No men are visible, save here and there a horseman, distorted by the smoke, into gigantic size. But soon the thickening smoke hides everything, and the position of the enemy can be guessed at, only by the roar of musketry and the whirr of bullets. Fire is now opened by the advancing line. At every twenty paces or so, a volley is delivered, until assaulting distance is reached; or the line recoils unmanageable.

Such is the normal battle as seen by the soldier in the ranks. There seems to be very little fighting in it, yet to the point of assault or disaster it is all there, without exaggeration or curtailment. Eight hours of marching and scrambling; one of waiting and suffering, and fifteen minutes of line of battle work.

It is not claimed that the end of the battle is then reached. The fortune of the day is not bound up in that of any single battalion. But this particular battalion has reached the point at which the assault begins; or it has been repulsed and is temporarily off the board. And where could individual marksmanship have been employed, except upon the skirmish line?

The point that we desire to make is, not that individual marksmanship is altogether worthless, but that its usefulness is misunderstood and very much exaggerated. The argument, so generally advanced in its favor, that a soldier should know the powers and capabilities of his weapon, and be able to use them with effect, is a mixture of truth and falsehood which few take the trouble to analyze. As we have seen, the opportunities which active service offers for the individual use of the musket are very limited, and never decisive. It is by line of battle work, that battles are won, and individual training actually disqualifies a soldier for the proper performance of that kind of duty. Of course the soldier should be taught how to shoot, just as he is taught how to march. But such training is merely preliminary, and intended to fit him to take his place in the company. He should not be permitted to carry away the idea that it fits him for the battle-field. The company is the unit for that kind of work, therefore the company must be trained, and its training is very different from that of the individual marksman. Indeed the training of a soldier in individual marksmanship is positively injurious to efficiency in the company.

The pit of error into which so many have fallen on this subject was prepared by the introduction of the rifle as a military arm. Men were so carried away with its range and precision, that the nature of line of battle work was forgotten. Then most people have an idea that soldiers in battle aim at individual enemies. Indeed the command "Aim" is itself misleading, and it is unfortunate that it ever found its way into the musketeer's manual. The old word "Present," was less misleading. It conveyed no idea of alignment on a definite object, and merely required that the musket should be brought into a prescribed position. But the word "Aim" got into the drill-book, and there it remains, teaching the line soldier a fatal falsehood to this day.

ON THE IMPRACTICABILITY OF ANY FURTHER DEVELOPMENT OF A FORM OF ATTACK AND ITS DISADVANTAGES.

Translated from the *Militär Wochenblatt* by Captain L. W. Bodé,
Middlesex Regiment.

The calling in of the proposals for possible modifications in the Regulations of 1888 has again brought to the fore the question of a further development of a given form for attack, contrary to the well known rule in the regulations, which strictly prohibits this. I must confess myself to be a strong upholder of this rule, and the object of this article is to shew that no definite formation can be laid down for the mass of varying conditions of war, and that distinct rules, which necessarily hamper freedom of action and independent judgment, are undoubtedly disadvantageous.

Let us first of all acquaint ourselves with the reasons brought forward by those in favour of a fixed formation. What is chiefly wanted is something definite to fall back on. The Regulations lay down principles according to which action is to be taken; the decision in any particular case is, however, left to the judgment of the leader.

An article which appeared on the 29th November 1890 in No. 102 of this paper acknowledges the excellence of the battle principles laid down in the Regulations, but comments on the absence of methods for carrying them out. A method is then worked out from the very beginning, according to which the men throughout the whole army are to be trained in time of peace on a uniform plan of mutual co-operation. As this method contains distinct suggestions, I will take occasion to come back to it more than once, but must mention here that the writer has been obliged to allow a certain freedom of action, in other words has himself had to fall back on the judgment of the leader. We now ask this gentleman if he really thinks that he has in his proposals united all the widely divergent views prevailing in the army. Against some of them we will bring forward most serious arguments; others will think some of them quite incapable of execution; in any case they would often be felt to be a serious drag hampering independent thought and action. It surely is not considered possible to force the lines of thought of our highly educated corps of officers to run in particular grooves, more particularly with regard to a subject on which it is impossible to form any just ideas in time of peace. Everyone knows that the attack will become more difficult, will be attended with heavier losses, but will nevertheless have to be carried out. It may also with safety be asserted that close formations will not again appear within certain limits; what the attack will in reality be like, no one can say with certainty, we all have our own ideas on the subject.

Another reason brought forward for the necessity of having a fixed formation is that first of all, on mobilisation and subsequently through the losses of war, the command of battalions and companies falls into the hands of persons who have not been trained to the position in time of peace, and whose judgment is not sufficiently matured to decide the questions that arise. A fixed formation is now to replace this want of judgment, to give the desired something to fall back on. I confess that if it were possible to devise such a method, I should certainly be in favour of its adoption in spite of the many disadvantages inseparable from it.

As intersected and enclosed country in its manifold variety exercises a controlling influence over the fight, the adherents of the formation give up the idea of employing it here, and limit themselves to an attack in the open across country swept by the enemy's fire. It might now be asked if there is no call for judgment on the part of the commander in this latter case, which is always frequent in certain phases of great decisive battles. It must, however, be admitted that an attack across the open is very much more difficult owing to the increased losses, and that the judgment of many persons becomes cramped owing to the greater danger, and in some cases disappears altogether. There is, therefore, some reason for demanding a formation for an open plain, so that the force of habit may to a certain extent make up for the want of leading.

We will now at once turn to the different calls which an infantry attack in the open successively makes on the leading. Passing over the advance to the battle, for which surely no one wishes hard and fast rules laid down, we will at once turn our attention to the first point at which the deployment for attack commences, and now the question arises:—At what distance from the enemy, and to what an extent ought this to take place? These would vary according as to whether the attack was directed against infantry alone or against artillery as well. We should not go far wrong in laying down these distances at 1,300 yds. and 2,200 yds. respectively. No particular advantage can be derived from this, owing to the uncertainty in judging at such great distances. The method referred to says that extended order should be resorted to as late as possible, and then lays down that every battalion in the first line should extend a whole company, which should cover the whole front of the attacking battalion. No further definition is given as to what is to be understood by "front." A whole company extended with an interval of only one pace even takes up a front of 330 yds.

How does this rule compare with the principles laid down in the Regulations, which are acknowledged to be excellent even by the author of the method. It is laid down in these (II. 22), that the first extension should be a sparing one, so as to preserve perfect freedom of action. In the beginning of the engagement a comparatively narrow front is considered advisable, and the front of a company should not much exceed

110 yds. (II. 25.) "The extension of whole companies should be avoided, or in any case delayed as much as possible. The company commander loses control over his company in the attack when wholly extended," (II 92). As these principles are generally admitted to be correct, the method under discussion is not likely to receive universal acceptance throughout the army, more particularly as he advocates the pushing of whole companies into the first line; a principle which according to the author himself brings down the sphere of action of the junior captain to that of a zug-leader. The degree of development of the extended line therefore remains as before in the hands of the company commander. In the vast majority of cases the extension of one zug would meet all requirements, and such a rule might without any great harm be taken up in the scheme. In the same way it appears erroneous to determine the number of companies a battalion commander is to extend. The advance of all four companies on the same front the regulations lay down as unusual, but the extension of two companies in a planned attack would often be advisable. To lay this down, however, would be to contradict the general principles in the Regulations referred to above. As, however, the command of a battalion would but rarely fall into quite untrained hands, the decision on questions that may arise can be more easily left to the judgment of the commander than in the case of companies. But let us now again go further, and see if it is possible to lay down certain rules for the guidance of a company commander in the attack.

We at once go to the important question of when to open fire. To lay down any definite distances for this would be a distinct disadvantage. The striving to get forward must not be allowed to cease under any circumstances; the first zug must get as near as possible to the enemy. As this is a call on the energy rather than the intellect of the leader, the followers of formations, as well as the author of the method, must allow this principle to stand. The rate of advance will of course vary very much. On the one hand it will depend on the energy of the leading and the morale of the troops; on the other hand on the conduct of the adversary and his fire. With regard to the last, various accidents have effect. One company may feel the full effect of fire, which passes over the heads of another company; the country also, however open, may occasionally favour an advance. If this is how war presents itself to us, the question arises as to how we are to imitate it in time of peace. According to our views, by allowing perfect liberty of action to the company commanders. The rate of advance will also vary on account of the diversity of views existing as to the distance at which fire ought to be returned, on account of the improvement in fire-arms. With regard to the opinion so often heard, that fire should be opened at 660 to 875 yards, I should like to draw attention to the necessity of testing the effect of fire at such long distances at head and shoulder targets during the annual attack practice. It would be necessary to check immediately after this opening fire. If all the initial conditions are now made similar to those of war, *i. e.*, begin the action after a fatiguing march, during the period of training, if possible with reservists called out &c.; if a considerable percentage is then deducted from the result due to the enemy's fire, it will become clear that firing at such distances is very like a simple waste of ammunition. The conviction that it is essentially necessary to approach closer to the enemy will become strengthened and confirmed. Let me be permitted to give expression to another wish here. We consider it very desirable that every infantry officer should be given an opportunity of attending yearly an attack carried out by a battalion brought up to war strength with its proper supply of ammunition. On account of the great expenditure of ammunition this will only be possible occasionally at larger manœuvres, and then only with blank cartridge. If any of those present experience what I did on the ranges, that all the buglers were not able to stop the magazine fire, they will in many ways correct their ideas about fire discipline, and realize that rules that appear practicable with small units and an expenditure of ten rounds, are in reality little less than a farce.

We once more turn to the opening of the fire, and cannot pass over the fire-action against a battery. Its tactical importance with regard to the special phase of the engagement must determine whether this considerable expenditure of ammunition, particularly at long ranges, is justifiable. The effect of the fire of a well placed battery may render the carrying out of an attack so much more difficult, that it may be necessary to divert the fire from the enemy's infantry, and direct it solely against the first named more important adversary. It is obvious that these conditions, as well as the dispositions for firing on the artillery (judging the distance, determination of number of men, züge, &c.), demand a certain amount of tactical and technical schooling on the part of the leader, and that they cannot be replaced by rules laying down a particular formation.

In the further course of the attack, the most important duty of the company leader is to utilise rightly the forces still kept back. Although it may sometimes only be possible for him to get the line of skirmishers to advance by pushing on a fresh zug, he should nevertheless endeavour to keep a closed detachment in hand as long as possible, as it is only by means of this that he can exercise any control at all on the course of the action. The proposed manœuvres with battalions brought up to war strength with full complement of ammunition would probably bring this practically home, for they shew how utterly impossible it is to exercise any control by means of the voice. When fresh men should be sent forward is determined by numerous ever varying conditions. It will depend on the enemy and the neighbouring detachments of the attack, and also on the position gained during the first advance. Be the country as open as it may, it yet offers differences which facilitate or hinder an advance. We now ask, how is it possible in face of such variety to lay down any hard and fast rules? The freedom and independence of the company commander is great, and should not be curtailed as the Regulations say (p. 126), for orders from the rear may easily be over-ruled by the situation. This independence is only limited in one way. The co-operation with the battalion must never be lost sight of. The battalion fight is a whole, the limits of which must never be crossed by any of its parts. Only by mutual co-operation for a common object can the difficult task of a modern attack be carried out. This community of action therefore renders it necessary in addition to observing the enemy, to see what is going on on either side and in rear. The steps to be taken in consequence are but a fresh call on the judgment and discretion of the commander.

We now come to the two last stages of the attack, the last fire position from which the enemy must be overcome, and the charge from this position. The Regulations again avoid, owing to the changing characteristics of war, to lay down any definite distance for this. It is, however, limited by the possibility of moving at the double from the last fire position to or at least close to the enemy's position. Though we consider the view taken by the Regulations to be correct, it yet appears necessary that some supplemental rule should be laid down for guidance in time of peace for the simple reason, that having regard to the health of the men, we cannot at peace exercises constantly call upon them for exertions which are demanded but rarely in war, even at the supreme moment of the final decision. In this case then it has become absolutely impossible to avoid additions so strictly forbidden in the introduction to the Regulations. Although in war the defender does not as a rule await the collision, in time of peace it is rightly considered necessary that the advance should be continued to the enemy's position; and thus a greater demand is made on the strength and lungs of the men. It has been tried in many ways to reconcile this difference between the demands of peace and war. The closed detachments have been moved in quick time, while the files of skirmishers kept up the fire, advancing by alternate rushes. Others, convinced that this cannot be carried out in time of war, do not even keep up any pretence at reality, but tell their men that such an advance without fire is unnatural, but necessary in time of peace on account of the health of the men. The desire further to make peace manœuvres as like war as possible had led to the last fire position being pushed forward as much as possible, so that the charge can really be carried out. If we consider that the experiences of the drill ground has shewn that distances are generally overestimated in the execution of the attack, and if we further consider that this last method makes the least call on a man's imagination, this may perhaps be regarded as the best way out of the difficulty. But it is not the object of these pages to find this, but rather to point out the necessity for some supplementary regulations, so that the present state of affairs may be put an end to, by which according to the fancy of the various superior officers, either one method or the other way be demanded. It is to be hoped the Regulations will lay down some rule, or leave two or three courses optional; either plan would answer the purpose.

The result of the investigation is, that owing to the great variety of the conditions of war, no formation will meet them, and that it can never take the place of the independent judgment and decisions of the leader. If in spite of this, clear rules were laid down for the attack, we should obtain regular pictures on the drill ground, but freedom of action and independent thought would cease, and all thoughtful men would look upon the formation as a chain, because it would not represent their idea of the battle of the future. We again turn to the scheme suggested and ask:—Could the leaders be blamed if they on the very first opportunity ignored the rules laid down, because they were contrary to the sound principles of the Regulations, and probably contrary to their own as well? The same would apply to any scheme, because as compared to the wide scope allowed by general principles, a formation can only be framed with a view to meeting the most common cases.

The unavoidable result of first tearing asunder these bonds, so unwillingly borne, in the presence of the enemy, will be the untrained freedom of fancy. As the Regulations now stand, every one is allowed to carry out his own idea in time of peace. Many shew themselves to be impracticable, others as incompatible with concerted action for a particular purpose. The freedom at present allowed in peace time gives opportunity for self education, and also for instruction by seniors, in cases where combined action is hampered by individual ideas. If the peace education of to-day only produces a conviction among all concerned that in spite of the liberty allowed to individuals mutual co-operation is essential to success, it appears to us that a very useful lesson for war has already been learned.

If it is brought forward as an argument in favour of the introduction of a fixed formation, that the command of companies and battalions in time of war often falls into hands of men who in time of peace receive little or no preparatory education for it, this contains a very grave reproach; a look at the army list might shew that it is often justified. This certainly requires rectification. Considering the length of time that company commanders retain their positions, there could be no objection to allowing lieutenants to command at drill the companies of senior captains. To prevent this becoming a dead letter, the inspecting officer should be obliged by regulation to satisfy himself that this rule, so important for the efficiency of the troops, was properly carried out.

The days are past when it was possible to hand over the reservists called out for 12 days drill to non-commissioned officers for days, because a senior officer had come to inspect the battalion. If this training of the senior lieutenants is opposed on the ground that the period of training would not be long enough to establish a sufficient understanding between the battalion commander and his captains before the inspection, we should answer that such an understanding between individuals does not meet the requirements of war. Mobilization at once alters the personnel of a battalion. War demands that all arrangements should be such as to be immediately intelligible to a company commander when newly appointed. If our proposal should in this way tend to simplify the regulations or make them more easily intelligible, this in itself must be looked upon as a gain.

THE "NEW DEPARTURE" IN INFANTRY TACTICS.

The proposals and ideas put forward by a German officer in the "Summer Night's Dream" were enunciated by an English officer no less than three years ago, viz., by Lieut. Colonel G. F. Young, of the Bengal Staff Corps, in a Prize Essay of the United Service Institution of India entitled "*The Infantry Tactics of the future,*" written in February, 1888.

Colonel von Hallen's proposals amount to three main ones; viz:—

I.—That the formation should be in a single line of men with just room to use their rifles properly and prevent jostling, *i.e.*, a pace to each man; advancing with all the regularity of the old line, but lying down to fire; that this will both give greater fire power (double the number of rifles in front line), and yet with not only no greater but with absolutely *less*, vulnerability.

Lieut.-Colonel Young's proposal is identical, and the reasons for it. (Paras. of the Essay, 5, 13, 14, 15, 18, 62, and the remark to Fig 3).

II.—That *all* re-inforcement should be (never by fusion, as now throughout Europe, of units into each other, but) by entire units into gaps; such gaps to be created by a constant closing on the centre man of the unit as casualties occur. Also all units (and sub-units) to have their seconds-in-command and even thirds-in-command regularly told off and ready the moment the leader falls to take command.

Lieut.-Colonel Young's proposal is identical, and the reasons for it. (Paras. of his Essay, 11, 12, 14, 15, 17, and 20; also the Figs 1, 2, and 3; and the note on last page).

N. B.—The sole difference is as to the unit taken in carrying out the principle; Colonel von Hallen takes (the German company being so large) the "zug" of 83 men;* Lieut.-Colonel Young takes the small British company of 100* men. The thing is the same, but any difference is wholly and heavily in favor of Colonel Young's proposal, the company being absolutely independent, while the zug cannot obtain (as von Hallen wishes for his unit) *complete* independence, but must ever be more or less maintaining, or trying to maintain, some sort of connection with the other two "züge" of the German company.

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* The maximum numbers in each case; of course after a week or two the Zug would be perhaps 50 and the company 70 men, which is what each of the two writers anticipate.

III.—That at present we have entirely lost (in *every* army) that discipline, steadiness, order, cohesion, and control over both men and their fire, which former generations knew to be essential to victory; that these are even more necessary now than then (even whatever the losses might be), and that they *must* be regained somehow; finally that they all will be regained by the proposals contained under I. and II. above. That at the same time losses will be *not* greater, but *less;* while also fire power will be doubled.

Lt.-Colonel Young's Essay is here again identical, putting forward exactly the same views and the same mode of obtaining the result aimed at. (Paras. of the Essay, 6, 7, 9, 10, 11, 14, 15, and 44).

Beyond and above the foregoing it requires to be noticed that the deeper we get into the re-inforcement of the front line, the more heavily Colonel Young's way of carrying out principle II. scores, or rather, the British company over the German zug does so; during the earlier stages it *may* be possible for the zug unit to keep touch of the rest of its own (German) company, but when we get beyond the first few re-inforcings of the front line, and to a stage when perhaps five or six lines in succession, or even more, have re-inforced the front one, it can scarcely be that the zug units will all, or even nearly all, have kept connection with their own companies; on the other hand Colonel Young's (British) company unit can go on *ad infinitum* unaffected by any number of such re-inforcings of the line, and it will be seen from cl. (1) para. 15 of his essay, that he contemplates with perfect equanimity the line at the later stages being formed of companies of all regiments in the brigade indiscriminately, but this creating no inconvenience or confusion *because the company is the tactical unit of modern war*, and being entirely complete in itself is unaffected by what regiments those on either side of it in the line belong to, or how long this state of things may last. Colonel von Hallen endeavours to make his zug act in fact as a little independent company, and just in so far as he is unable (by the German organization) to do this *entirely*, so far Colonel Young's proposal has the advantage. As the latter says in his para. 17 "*Our organization so exactly suits the new conditions, that one might fancy it had been expressly devised by some far-seeing brain, looking forward to the day when the battalion could no longer be the unit in action, and a much smaller one be required.*" .

N. B.—The restricted space (a limit of 32 pages for a subject of which this only formed a part) necessarily prevented the subject from being elaborated to the extent it is in Colonel von Hallen's most clever and readable "Summer Night's Dream," but this is a detail which in no way affects the main issue, which will be found fully worked out in the paras. of the Essay on "*The Infantry Tactics of the future*" which have been quoted, and which latter paper has the advantage of nearly 3 years in point of time.

United Service Institution of India.

EXTRACT from the Proceedings of a Meeting of the United Service Institution of India held at Simla on July 9th 1891.

Present:

His Excellency The Commander-in-Chief *in India, Presiding.*

The Hon'ble Lieut.-General H. **Brackenbury**, c. b., r. a.

Major-General W. **Galbraith**, c. b., *Adjutant General in India.*

Major-General Sir James **Browne**, k. c. s. i., c. b., r. e., *Quarter Master General in India.*

Brigadier General G. E. L. S. **Sanford**, c. b., c. s. i., *Director General of Military Works in India.*

Colonel R. C. **Hart**, v. c., r. e., *Director of Military Education in India.*

Colonel R. G. **Woodthorpe**, c. b., r. e., *Deputy Quarter Master General Intelligence Branch.*

Colonel W. G. **Nicholson**, r. e., *Military Secretary to H. E. the Commander-in-Chief.*

Captain F. A. **Hayden**, *West Riding Regiment (Secretary.)*

PRIZE ESSAY.

In accordance with the report of the referees, it was resolved,—

1.—That the "Gold Medal" for 1890-91 should be awarded to the writer of the Essay bearing the motto "There are as good fish in the sea as ever came out of it" (Lieutenant F. G. Cardew, 10th Bengal Lancers, Adjutant General's Department).

2.—That the following Essays should, together with the Prize Essay, be published in the Journal, viz:—

"Forward" (Lieut.-Colonel M. J. King-Harman," 2/4th Goorkhas).

"Thanks to the kindly dark faces, who fought with us faithful and few" (Major E. G. Barrow, B. S. C.)

Essays bearing the following mottoes were also received:—

"Palma virtuti."

"Survey la raison."

3.—The Council beg to acknowledge the valuable services rendered by the referees.

The Journal
OF THE
United Service Institution of India.

VOL. XX. 1891. No. 86.

OUR RECRUITING GROUNDS OF THE FUTURE FOR THE INDIAN ARMY,

In view of obtaining the best material available for soldiers, the 'Pax Britannica' having reduced the warlike spirit of some races which have hitherto supplied our native armies, by inducing their youth to lay aside the sword for the ploughshare.

PRIZE ESSAY:—GOLD MEDAL.

BY LIEUT. F. G. CARDEW,
10th Bengal Lancers, Adjutant General's Department.

"There are just as good fish in the sea as ever came out of it."

Preliminary.

A subject so wide as the above, embracing so many side issues, involving so many difficult and oft discussed questions, dealing with so many problems of the first importance in the political and ethnological history of a great empire, can only be approached by the most experienced and competent authorities with care and circumspection. With how much more diffidence then, should such a subject be treated by any who have not the advantage of such experience, whose personal knowledge is limited to one or two branches of the extensive whole, and who are compelled to rely on the published writings of others often very scanty in detail, or untrustworthy by reason of their age, for their guidance in the many remaining parts of the question?

To deal thoroughly with such a subject would indeed require an experience which but few men, and they the most senior in the Indian service, can boast of. For it is not enough to consider any one part of our Indian armies, though with the utmost detail, while passing over some other portion as unworthy of careful notice. The forces of each Presidency are equally costly to the State, each therefore should be of equal value for the work to which they are best suited, each should receive such careful consideration as will bring it to the utmost possible pitch of efficiency. And to grapple confidently with such a task, requiring as it does a competent knowledge of all the races represented in the Indian army, from Peshawar to Cape Comorin, from the Pathan to the Tamil, and with many others too, who are not at present represented, but who might if properly dealt with furnish worthy material for our ranks in the future :—such a confidence can, we repeat, be only felt by few, nor, it is hoped, will such suggestions as are hazarded in the following pages be regarded as the hasty rush of folly over ground where the wisest may well fear to tread.

Arrangement of the subject.

Before proceeding further it will be well to examine the premises of our subject, and to lay out roughly the lines on which the question is to be considered. The main idea suggested by the wording of the heading of the essay is, that at no distant period our Indian armies will have to cease their dependence on the races within our borders, which have helped to achieve our eastern conquests of the past hundred and forty years, and that we shall have to seek some fresh ground, some as yet untried race, in the place of those who have succumbed to the enervating influences of civilization and peace. But this assertion is by no means a sweeping one ; it is only 'some races' who have lost their warlike spirit, and whose place in our regions must be taken by others yet unspoiled. No particular class or race of the many and heterogeneous peoples which serve under the British flag is specified, and herein lies the wideness of the subject: obviously the necessary course is to examine in detail each one of the component parts, to consider its past services, its present efficiency, and its probable value for future use; to decide whether careful repair in the case of those parts, which may seem to have decayed, will not be effectual in restoring them to a condition of usefulness ; to condemn those which are worthless ; to advocate a more extensive use of such as are in their prime ; and, finally, to cast about for new material to replace that which has not stood the test of scrutiny.

This then shall be our plan of procedure : taking the army of each Presidency in turn, we will consider in detail the races and classes of which it is composed, and having decided which are worthy and which unworthy of further use, we will endeavour to discover how the former may be increased, and how the place of the latter may be supplied.

The Bengal army.

In dealing with the Bengal army it will be convenient to adhere to the distinctions Hindustani and Punjabi, as commonly used, and under the first heading to include those classes from which the northern army was recruited previous to the conquest of the Punjab.

Hindustanis-Brahmans.

Commencing with the soldiers who have largely filled our ranks since first we had an army in Bengal, we find in the Brahmans of the north-West Provinces a military material which has now as few supporters as in former days it had detractors among Indian officers. In their favor it can be urged that they are clean, smart soldiers, singularly well behaved and free from crime, of soldierly appearance, and generally of good physique. With them our ranks were filled when we fought the Mahrattas, the Gurkhas, the Jats, the Afghans, and the Sikhs: is it more than the prejudice engendered by their share in the events of 1857 and 1858 which causes us to decry them now? Can it be proved that the Brahman element of our best Hindustani corps is one whit inferior to the men who fought under Lake? Indeed it would be difficult to do so; but this answer does not necessarily imply the value of the Brahman for the requirements of modern war. None of the conflicts, in which the Bengal army was victorious during the first half of this century, can be in any way compared to the fighting which the future may have in store for it. The disorganized masses of the Mahrattas, deprived of their one source of strength, their European officers, these were the only foes which the Bengal sepoys overcame without a struggle, when supported by British troops at the head of every advance, and British officers to lead every company. Different indeed was the result when an enemy of a sterner calibre was to be met; the disasters of the Gurkha wars, the failures in Afghanistan, the victories of the Sutlej, won more by the internecine strife of our foes than by our merits, are all blots on the record of the Hindustani sepoy rather than achievements to be named in his defence. How were the hardy mountaineers of Nipal eventually overcome, but by the employment of an exceptional number of British troops? Who stormed the breach at Bhartpur, where twenty years before Lake's victorious army had been again and again defeated? The British Grenadiers and the Sirmur Gurkhas. And how can any one who has read the history of the Sikh wars, especially the narratives of eye witnesses, as for instance the memoirs of George Broadfoot, point to those battles as glorious to the regular Bengal sepoys? That in the earlier years of the army there were episodes of which any soldiery might be proud, is undeniable; the conduct of the sepoys in Monson's retreat, the defence of Delhi, the 2nd Battalion of the 15th (now the 2nd Bengal Light Infantry) at Bhartpur, these are all incidents to which the admirer of the old army can justly point with pride; but it is equally true that against formidable antagonists such as the Gurkhas, the army as a whole could not be trusted even when led by British company officers. How much less then can we depend on those classes if called on to meet an European foe, and that too under the leadership of natives? It is hardly necessary to re-iterate the charges against the Brahman of his unbending caste prejudices, his want of stamina, his abstinence from sustaining food, and especially his love of intrigue; all these are notorious and have been so any time these 50 years. If a certain number of regiments are to be kept up, which may be employed in our local wars or on the lines of communication, in them the Brahman may be advantageousy employed; but the numbers of this class are spread over too great a proportion of our regiments and should be confined to as few as possible. According to the last returns there were something like 3,000 in the Bengal army, a total which might well be reduced by at least one third, and yet leave too many. In a word, the case may be summed up by the judgment that, though the Brahman has done good work, and has many merits, yet they do not counterbalance his defects, and he should cease to form any considerable item in our army.

Rajputs.

With regard to Rajputs the question cannot be answered with such confidence. In the Bengal army there are upwards of 6,000 of this class, nor can it be denied that of these the great majority are of little more value than their Brahman fellow soldiers. "The Rajput," writes Major Barrow in the 'Sepoy Officer's Manual,' "no longer means an inhabitant of Rajputana. As a matter of fact hardly a Rajput in our army comes from Rajputana." Here lies the secret of their supposed decay; they were not Rajputs of Oudh who fought under Colonel Skinner and gained the fame of being the best light cavalry in India; they were Rajputs of Rajputana, warriors and horsemen by nature and descent, the inhabitants of a country, which gave more trouble to the powerful Mahratta confederacy than any other, because where the members of other races fought only on compulsion, and furnished but a percentage of their numbers to the army, here every villager was a warrior, and turned out to repel the attacks of their enemies as readily as the ryot goes out to plough. That they have lost much of their keenness for fighting under our peaceful rule is probably true, they have settled down to a less stirring order of life; but the spirit remains, and needs but the military training to make it as reliable as ever it was. There is one regiment, the 7th Bengal Infantry, which is distinguished by having real Rajputs and not mongrel mockeries of the class, and it is probably second to none in the Bengal Infantry. And who that has seen or heard of the cavalry corps, which have during the last year been trained in Rajputana by Major Stuart Beatson, can maintain that the fighting spirit of the Rajputs is dead? Regiments of such men are worth having in any campaign, but amongst our 6,000 Rajputs there are very few such. What is required here is to weed out the inferior article, and instead of decreasing rather to increase the Rajput element in the cavalry; but more attention must be devoted to recruiting, nor should every man of the required standards be enlisted because he calls himself a Rajput. That a satisfactory result can be obtained by such methods is proved by the 7th Bengal Infantry, and if by that regiment, why not by others? A wide field for recruiting exists in Rajputana; the material is excellent; this then is not one of the classes which should be lightly set on one side as worn out and worthless.

Mussulmans.

Perhaps no class has in its day done more to aid the British power in India than those who fall under the comprehensive term "Hindustani Mussulmans," at the same time under no heading probably is there now more worthless material. The implication is not desired that the whole of the 6,000 odd of that class are of no value, but there certainly is a very large percentage amongst them which must be thus characterized. In the first place a large number of those who fought, and fought well, for us in our early wars were adventurers and loafers from the northern parts of India. Muhammadanism is a religion which notoriously stagnates unless roused by fanaticism, and it is not to be expected that fifty years or more of a peaceful rule can have improved the descendants of such men as these and of the riff-raff with whom they married into very steady or serviceable soldiers. Moreover Muhammadanism is the refuge of many of the lowest classes of the Hindu population, and for this as well as the last named reason the greatest caution should be observed in recruiting men of that religion. At the same time, though the best Mussulman material now available is probably inferior to the Pathans and Rohillas of the first half of the century, it would be hard to say that it is not still of value. Besides the large number in the Bengal army, the class furnishes a considerable quota to Bombay, and to the Hyderabad Contingent, some of whose officers declare that these men are the best in their very excellent cavalry. The class to be avoided are those whose brothers and fathers are standing behind their officers' chairs as kitmatgars, town bred men, who never were nor ever would be a fighting class, and who generally have not even the virtue of being smart and clean. While we would not cease to recruit Hindustani Mussalmans for our army, we would reduce their numbers; the better classes, who are of any value as fighting men, are limited, and the demand is greater than the supply. Above all, as with the Rajputs, so with the class before us, more care should be taken with recruiting.

Lower castes.

Of these classes, officially known as "other Hindus," little need be said; previous to the Mutiny none but Ahirs and Gujars were enlisted. The experiment which was then tried of forming low caste regiments proved in every way a failure, and the enlistment of most of such classes was stopped some years back. Ahirs and Gujars are not entirely valueless, but their numbers should be small. The 2,700 under this heading in 1889-90 has been reduced by the late re-organization of four regiments, but the number which remains might be still further lessened with advantage, and "other Hindus" should in future include none but the two castes just mentioned.

Gurkhas.

It will here be convenient to turn aside from the distinctly "Hindustani" classes to consider those hill races of the Himalayas, whose members for the last 75 years have supplied us with our most valued native soldiery. Foremost among these are the Gurkhas, whose good qualities are too well known to require any description here, and with regard to whom the only disadvantage is that we cannot get enough of them. We have now in the Bengal army thirteen battalions or above 11,000 men, and to supply the annual requirements of these battalions in the way of recruits is a task by no means without difficulty. It is the received idea, and one which has been emphasized of late years more than formerly, that the only classes fit to be recruited are the Gurungs, Magars, and Thakurs. That these are the best material obtainable is undoubted, and they give us soldiers of the most perfect stamp; but as the supply of them is difficult to increase, and as it has become necessary to cast about for the wherewithal to fill the gaps caused by the rejection of races hitherto recruited, would it not be well to see if some others of the castes of Nipal are not worthy of a trial? The Khas Gurkhas, the predominant race of Nipal, was by no means debarred from enlistment in the Company's army during the first half of the century; but with the Indian Mutiny came a strong tide of prejudice against anything approaching Brahmanical exclusiveness, which has never disappeared, and which eventually entirely stopped the recruiting of Khas Gurkhas in our regiments, as it also established an unfavorable opinion of Dogras—how erroneously we shall see presently. The Khas caste are certainly more liable to Brahmanical prejudices than other Nipalese, but these prejudices do not trouble them in matters relating to food, or the ordinary duties of a soldier's life. Rather they are conducive to cleanliness and sobriety, so that the Khas Gurkha combines many of the temperate qualities of the Hindustani Brahmans with a bold, hardy, and distinctly soldier-like nature. Brian Hodgson says of the Khas, that they have "certainly no religious prejudices, nor probably any national partialities, which would prevent their making excellent and faithful servants-at-arms, and they possess pre-eminently the masculine energy of character and love of enterprise, which distinguish so advantageously all the military races of Nipal." In the Nipalese army the Khas are found to make excellent soldiers, and are especially valuable as officers; a large number of them could be obtained if required, and a percentage in every regiment would be an unquestionable advantage.

Besides the Khas we might find good fighting material among some of the lower castes, especially from the Newars of the Sirish caste. A certain number of these are in our Gurkha battalions; the 5th Gurkhas have had several, and Subadar Kishnbir Nagarkoti of that regiment is a good example of what fine soldiers are to be obtained from amongst them. They are an agricultural class and not natural soldiers, but only care in recruiting is necessary for a very valuable addition to our resources to be made from their number.

The only other caste likely to produce good soldiers are the Limbus, also an agricultural class, who are said to be of good physique and brave, but who labour under the disadvantage of being headstrong and very quarrelsome with other castes. If this, however, be their only fault, it is shared by other and valuable classes, which we enlist freely, the Afridis for example, and might be remedied by embodying them in a caste regiment.

Finally, it does not seem that our present demands ought to exceed the supply of the usually enlisted classes. If it be desired to further increase our Gurkha corps, it would be decidedly advisable to see what can be done with the other castes mentioned above, especially the Khas. In any case it is of the highest importance that the recruiting shall be carefully carried on, and that for this purpose thoroughly efficient recruiting agents be stationed at Gorakhpur.

Gurhwalis and Kamaonis.

The only other hill races of this part of India, which find a place in our army are the inhabitants of Gurhwal and Kumaon. A large number of both have always been found in the 3rd Gurkhas, or Kumaon battalion, a regiment which has on many occasions done excellent and distinguished service. It has always, however, been the fashion to decry these classes amongst officers of exclusively Gurkha corps, and Sir Charles Reid K. C. B., formerly of the Sirmur Rifles, writes of Gurhwalis "I never heard them well spoken of." Now for the first time the experiment of a distinctly Gurhwali battalion is being tried, when the class will have a chance of fair trial, and not be liable to incessant comparison with Gurkhas, of course to the advantage of the latter, who are undoubtedly finer soldiers. For the present it would be hardly wise to predict to what extent this material will be found worthy of use, but if the experiment turn out a success, the supply is up to a certain point a plentiful one.

Jats.

We have left the Jats to the end of the so-called Hindustani classes, because they form a connecting link with the Punjab, and from the Jats of Hindustan it is but an easy step to their brethren of the northern province.

It is not necessary here to discuss the vexed question of the origin of the Jats, or the periods of their settling in India; suffice it to say, that whether we spell their name with the broad *a* of Hindustan or with the shortened sound of Punjabi, that whether we write of the cultivator of Bhartpur, of the Sikh of the eastern Punjab, or of the camel breeder of the Montgomery *bar*, all are equally of one race, all have many characteristics in common, and the first two at least have shown that no finer material for soldiers exists in India.

To consider first of all the branch of the race which is settled in Hindustan. We find in them a hardy, agricultural people, of exceedingly fine physique, entirely free from caste prejudices, brave in war, and readily amenable to discipline. Only twice did we come in contact with them in our wars of conquest; on the first occasion, in 1804, they successfully withstood the determined attacks of Lord Lake's victorious army during a siege of several weeks; and when at last in 1826 their capital and stronghold of Bhartpur was taken, it was not without a brave and determined resistance, which reflects as much credit on the vanquished as on the victors. Since that time they have settled down peaceably to their national occupation of agriculture, and have proved as loyal to our rule as they were previously devoted in their defence of their country. Being exceptionally free from any kind of caste or religious prejudices, eating all sorts of flesh and cooking together without observances of any description, they were looked down on by the high-caste sepoys of the Company's armies. Hence, probably, arose the fact that previous to the Mutiny they were not found in the ranks. In that crisis, however, such material, untainted by disaffection and allied by no ties to the mutinous soldiery, was not likely to be passed over untried, and the "Jat Yeomanry," better known as "Murray's Jat Horse," was second to none in the brilliant service which it rendered against the rebels.

The Jat, however, has one fault; he does not get on with any other class; he is unpopular with his Sikh cousin of the Punjab, and he hates Muhammadans, a feeling which is cordially reciprocated. Herein lies the secret of his non-success in the ranks of our army; sent to serve in mixed regiments under Brahman and Muhammadan officers he was, and always will be, a failure; he is as independent by nature and as sensitive of abuse, as he is strong in his dislikes; under these circumstances it is no wonder that the scheme, which was tried by Lord Strathnairn, for the general enlistment of this class, was an entire failure. In one regiment only, as we have seen (the 14th Bengal Lancers), have the Jats had a fair trial, and no one can assert, in the face of the performances of that regiment in Afghanistan, that the warlike spirit of the race has been reduced by the Pax Britannica. Give them a chance under favorable circumstances, that is in class regiments, or, at the very least, regiments comprising a large proportion of them, and raised not in driblets, as was the case with the 38th Bengal Infantry, but enlisted in large numbers, with native gentlemen of their own race obtaining appointments as their officers; and under these conditions it may be safely affirmed, that their success will be assured, and that they will be as fit as any Indian corps to fight our battles against any foe.

The physique and soldierly qualities of the Jats of the Doab vary considerably in different districts; recruits should be sought from Bikanir and Rohtak in preference to the Aligarh and Saidapur districts; from the former places a supply is available far in excess of the present demand made upon the race by our army, which previous to the re-organization of the four Hindustani regiments amounted only to a total of 3,650. Here then is a field for recruiting, which is at present almost untried; it gives us soldiers whose bravery is assured, whose qualities are vouched for by those who know them best: let us not then hesitate to use material so good and so ready to hand.

Punjabis. Sikhs.

We turn now to the second main division of the Bengal army, to those races whose services were won for us by the annexation of the Punjab, and who so effectually proved the value of those services in the troubled times of the next decade. Foremost amongst these are the Sikhs, the descendants of the sternest foes our arms ever encountered in the plains of India, and who, like the Jats of Bhartpur, once conquered, proved themselves the staunchest and most loyal of our allies. Of the virtues of the Sikh, his value as a soldier, and his military traditions, it would be superfluous here to speak; everyone knows them, and knows too that they exist now as well as they did thirty years ago. Nor does it seem necessary to trace the history of the class, or to show which sections of it are the most successful as soldiers and the most strongly represented in our army. The question to be decided is whether the numbers now required for the Bengal army can be increased, whether they can even be kept up to their present standard, and to each the answer must unfortunately be in the negative.

As every one in India knows, the Sikhism of Govind Singh is the outcome of a disturbed state of society. Persecution, tumults, wars, these were its very *raison d'être*, and nourishment. Can it be expected then to flourish under a government which secures uninterrupted peace and prosperity? When he takes the *pahal*, the son of a Sikh devotes himself to a life of strife; but men who have passed their lives in the undisturbed monotony of their village, tilling their fields and reaping their corps, are not as eager as their fathers were to enforce the vow of their cult on their sons, nor do the sons of such fathers grow up with the glory of the battle-field before their eyes as the one worthy aim of life. Yet it may be thought, that though the followers of Govind Singh are becoming less, the hardy agricultural race remains and is equally fitted to fill our ranks. This, however, is only partly the case; not only is the number of the cult decreasing, but the physique and soldierly qualities of the race are not what they were; and this is due to other causes besides the loss of the stimulating Sikh vow; disease is rife throughout the eastern Punjab, and those who have considered this question declare that whole villages are rotting to decay. Nor can any one who sees the *umedwars* for Sikh corps doubt but that this is true; the number of rejected recruits is far in excess of what it was even a dozen years ago, and it will go on increasing; regiments, especially those which have a good name, are still able to obtain their required complement of likely men, but every year the difficulty becomes greater: in some corps it has already become almost insurmountable. There were last year about 17,770 Sikhs in the Bengal army; this is of itself a very large percentage of the total male population, and when we remember that several hundreds more are furnished to Bombay, to the Hyderabad Contingent, to the Burma Police, and to Perak, it may be readily believed that the supply has reached its extreme limit; more than that, it has already begun to fail. The chief argument of those who do not hold this view, is that because we were able four years ago to raise two new regiments, all of whose men are of the finest description, in a surprisingly short space of time, therefore we could do so again to-morrow, and can too furnish these and other Sikh corps with their annual quantum of of recruits. But such a contention loses sight of the fact, that those men were enlisted under the most favorable conditions, that is to say, for class regiments, which are always and naturally popular, officered by picked men of position and influence in their districts; for such an object an exceptional and unnatural fillip was given to the desire among the young generation for military service; and these are the regiments which do not yet find difficulty in obtaining recuits. Corps where there are isolated companies, troops, or squadrons, these are they which feel the difficulty first, and where the shoe is already beginning to pinch. Without greatly reducing the numbers of Sikhs in our ranks, the supply may be kept up for some years to come by improved rules of recruiting, and, especially, by collecting the class into a smaller number of regiments; but it seems a certainty, and one much to be deplored, that eventually the total must be reduced, and assuredly it cannot be increased.

Punjabi Muhammadans.

Of all the classes in the Bengal army none includes a wider field than that known officially as Punjabi Muhammadans. The vast majority of them are of Hindu descent, and these may be divided roughly into those of Rajput and those of Jat origin. Each division contributes a large quota of very valuable soldiers to the army, but the numbers in each case might by judicious management be considerably increased. The Muhammadans of Rajput origin outnumber their Jat co-religionists in the ranks, both because of their race traditions, and because their dislike for agriculture, coupled with Sikh oppression, has reduced them, as a rule, to very poor circumstances. Of the clans which are represented amongst our soldiers the Jodras and Alpials of Rawal Pindi, the Tiwanas of Shahpur, the Chibhs of Gujrat, the Janjuas of Jhelum, and above all the Bhattis, who are found in almost every part of the Punjab, are all hardy, athletic races, furnishing good soldiers, and invaluable as a recruiting ground, and in addition to them there are others of equally fine capabilities, but which have at present been but very imperfectly developed. Amongst these are the Sials of Jhang, one of the finest and most important clans of the Punjab, whose members served in the Sikh wars and in the Mutiny, but who seldom enlist now; while the Dogars, formerly celebrated only for their lawlessness and cattle-lifting propensities, but who are also noticeable for their hardy temperament and fine physique, and who are settling down under a strong, quiet rule, into peaceful members of society, might well be given a trial in the ranks of a suitable regiment.

Of the Gakkhars and Awans, tribes of Rajput rank and of great consideration, but not of Rajput descent, all that need be said is that the latter are but slightly the inferior of the two. The men of both clans are of good physique, hardy, and active; both enlist freely and make excellent soldiers.

The Mussulman Jats of the Punjab are on the whole hardly equal in physique to their unconverted brethren, nor do they contribute near as many men to the army as their Rajput co-religionists. Of their tribes the Ghebas of Rawal Pindi and Gondals of Gujrat and Gujranwala are probably as much Rajput as Jat; both are remarkable for magnificent physique and have a great reputation for courage, but neither supply our regiments with that number of recruits which their characteristics should render probable, and which would certainly be advantageous to us. The Jats of the Ravi, too, are celebrated for their courage and endurance; they labor under the disadvantage of a tendency to cattle-lifting, but this again is dying out under British rule, nor is the habit confined to them; but few, however, are found to enlist, although there were large numbers of them in the armies of Ranjit Singh, a fact which seems to show that their backwardness might be overcome without much difficulty.

We may pass rapidly over the Punjabi Pathans of Kasur, Faridkot and Maler Kotla, and the Multani Pathans, than whom no finer material for cavalry soldiers is to be found in any country; all of these are well represented in the Bengal army, but of none is there a man too many. They all make excellent soldiers, and the Multanis especially might with advantage be enlisted in greater numbers.

The Biluchis of the Punjab will be considered separately, and the only Mussulman class which remains are the Gujars, a people who bear but a very indifferent character in the southern districts, but who in the north, in the neighbourhood of Rawal Pindi, are a steady and honest race, and possessed of the qualities which go to make good and useful soldiers.

We have said enough to show, that in the class called Punjabi Muhammadans there is sufficiently good material lying unused to make up for many of the deficiencies which have been noticed elsewhere; the last returns show only 7,700 in the army. Few of the clans which have been mentioned are anything like fully represented, many though sufficiently promising are quite untried: let us hope that in these days of increased demand such material may no longer be neglected.

Dogras.

In the Dogra we have another class of which little but good can be said, and which certainly does not come into the list of those which have deteriorated under the Pax Britannica. Although usually credited with Rajput origin the Dogras are probably not of pure Rajput descent, nor ever belonged to that royal stock, which is born to handle no baser instrument than the sword. At all events the use of many generations has substituted agricultural pursuits for the arts of war, nor within historic times has the race, like the inhabitants of Rajputana, had any pretensions to a distinctly military character. None the less, however, have they served well and faithfully in the armies of the ruling power of the Punjab, were it Muhammadan, Sikh, or British, and all masters alike have found them docile, trustworthy, and loyal soldiers, who, though without the brilliant daring which makes other races more conspicuous, are nevertheless possessed of a steady and quiet courage, which in the hour of need is as useful and perhaps more rare. Their caste prejudices have often been, and are still, urged in their disparagement, especially by those who have never been in contact with them; but all who have served with them know, that where the exigencies of the service are concerned the Dogras are ever ready, if properly treated, to lay aside their punctiliousness and to make the best of the situation in which they find themselves. One rule, however, should always be observed in recruiting from this class, namely to avoid the enlistment of Brahmans, with whom alone will any difficulties of caste be serious. The best authorities who have seen and served with the Dogras in peace and in war, concur in their high opinion of the value of the race as soldiers, and this appreciation has been manifested during the last four years by the addition of two whole regiments to the Bengal army. The numbers, however, of the Dogras of British territory are limited, and previous to the re-organization of the 38th Bengal Infantry, there were already something like ten per cent. of the whole class serving in the ranks. At the same time the Kashmir state would afford a large additional supply, of which the value, though declared by some to be inferior to the material now enlisted, would probably prove on experience to be in every way equal to it.

Pathans.

And now let us turn our attention to the quarter whence, more than from any other, the future supply of soldiers for our Indian army is looked for. Immediately on our borders we have dependent and independent tribes numbering some 215 000 fighting men, born soldiers from their youth, nurtured in an atmosphere of wild, mountain strife, where might is right and he who cannot fight must go to the wall; a race of men who while yet unspoiled by the enervating advance of our western civilization, have learned by forty years experience to respect our national justice and to admire the courage and the discipline of our troops; a race pre-eminent in India for physique, courage, and intelligence, whose qualities are such, that even when feebly represented by their kinsmen who wandered into the plains of Bengal, and then, forgetful of their native hills, were to a great extent enervated and emasculated by the Circe-like influences of Hindu luxury, even these poor representatives of the Pathan race were eagerly sought for by the princes among whom they settled, and were counted amongst the flower of their armies; a people, too, whose wants are small, who are trammelled by no prejudices of caste, whose light-heartedness is over-shadowed by no restraining priesthood, and whose love of home is only outweighed by their fondness for adventure. Can it be wondered at, that all who have lived amongst and led such soldiery as this, should long for a more complete recognition of their merits, and for more earnest efforts to attract them to our armies? Certain it is, that in any operations beyond our North-West Frontier the border Pathans must be either for us or against us, and who can hesitate in deciding which of the two alternatives is the preferable? Those who oppose a larger employment of trans-frontier tribesmen have commonly two arguments to urge against the measure: of these the first and by far the foremost is the suspicion of their want of faith; these men, we are told, when asked to fight against their fellow-countrymen and co-religionists, have more than once played us false in the past, and the chances are that they will do so again; the test is too severe a one with which to try the fidelity of a race, whose fickleness is notorious. But what are the grounds for this accusation? Needless to say, the story of the night march against the Spin Gawai Kotal, and of the two shots which awoke the echoes of the silent night, and threatened to render the enterprise a failure before it was well begun: this is the proof which will be offered of the untrustworthiness of a whole race. Yet those who know the frontier and its histories can bring forward half a dozen instances of signal loyalty, as a set off against every one anecdote which is used to decry the merits of the Afghan; and not the least is that one, which took place only four years after our first appearance on the Punjab border, when the native officers of an infantry corps themselves pointed out their relatives and kinsmen in the ranks of the enemy, and desired that their fidelity to the British might be made doubly sure by the speedy shedding of blood on both sides. Nor is the record of the Ambela campaign a weak witness of the faithfulness of our Pathan soldiers, when the frontier regiments fought without sign of wavering against members of nearly every tribe on the border.

The other stumbling-block to a more general employment of Pathans is, we are told, the poorness of the monetary attraction offered by a military life. Unfortunately, soldiering cannot compete with civilian labor in the matter of pecuniary reward; but the Afghan tribesman is attracted by something more than money to such a calling. He is a soldier by training, by tradition, and by inclination; these influences will aid the glitter and sentimental attractions of the army, as well as its coveted advantages of pension and regular pay, in bringing as many recruits to our colors as we care to call for.

If we glance for a moment at the frontier tribes and their numbers, we shall be able to form a better idea of the extent of the material which here lies ready to our hand. Of the Pathans already in our ranks the majority come from amongst the Khattaks, Bangashes, Orakzais, Yusufzais, and Afridis; the first named are the most favorable specimen of the race, whose brave and independent spirit is not marred by the lawlessness of the Afridi or the exclusiveness of the Waziri; all the above are good material for soldiers, and the same may be said of the other tribes of Kohat border, the Zaimukhts and Mangals. The great tribe of the Afridis, some 23,000 strong in fighting men, has been the subject of more discussion than any other on the frontier. Their wild and uncontrollable nature has long been an obstacle to their employment except in very small numbers, but as experience teaches our frontier officers their value, their enlistment is being more freely resorted to, and it now requires no arguments to prove, that the Afridi, if enlisted young from one of certain Khels (the Malik Din, Zakha, Kambrar or Adam), and if kept apart in class companies of his own, becomes a soldier second to none in fidelity, excellence of discipline, and love of his profession.

Nor are the good qualities of the Orakzais behind those of Afridis, and yet of 30,000 fighting men, only some 800 or 900 are in our ranks. The Shinwaris (12,000 men), the Bunerwals (12,000), and the Bajauris, (30,000), all form good material, the latter especially so, who are famous not only for their manly qualities, but also for their peaceful character. The Mohmands (17,000) are recommended by some authorities, and doubtless good men can be obtained from among them, but they have a bad reputation for treachery, nor is their bravery above suspicion. Then there are the Yusufzais (25,000), who represent the civilized Pathans, and whose only fault is their aptness to deteriorate among the enervating influences of life in the plains. Finally, the Waziris (40,000) are a splendid race, brave, truthful, and hardy, but are deterred from enlistment by their traditions, which strengthen their family ties and bind them much to their kin and to their homes, while they are commonly viewed with dislike by other Pathans; if, however, enlisted in class companies, as in the case of the Afridis, there could be no question of their value as soldiers.

Enough has been said to show, that among the Pathan tribes of our frontier we have a recruiting ground which is not likely to fail us in point of numbers for a long time to come; at present the number we draw from this mine of wealth reaches only the low figure of some 6,000; here then we may look for supplies to fill up deficiencies, hence we may draw material if we want further additions to our army; and as our sphere of influence increases, as it must increase, the tribes which are now reckoned too wild to be fit to serve in our disciplined ranks, will in turn be subjected to the same process, which in the last forty years has so perceptibly influenced the Afridi and the Waziri.

Biluchis.

The race now before us, and with which we conclude the review of of peoples represented in the Bengal army, may be divided into two classes. The first of these, the Punjabi Biluchis, are found chiefly about Multan, as well as in the Shahpur and Dera Ismail Khan districts, and in the Sindh Sagar Doab. They are an agricultural people differing but little from the Mussulman Jat of the Punjab, in physique thin and wiry, in temperament frugal, hardy, and brave. They enlist to a certain extent and make good soldiers, but the number of them is hardly representative, and it might by care and attention be largely increased with great advantage to the army.

Secondly, there are the true Biluchis of Biluchistan and its immediate frontier, a race whose merits have long been recognized, but whom we have at present all but completely failed to induce to enlist. This class has hitherto belonged rather to the Bombay than to the Bengal army, seeing that the former has three regiments of infantry, which bear its name; but it will be convenient to treat of them finally in this place, especially as a Bengal regiment has now been localized in their midst. The inhabitants of Biluchistan are an extremely hardy race, of good physique, with a character for bravery, free from fanaticism, and of exceptional fidelity and straightforwardness. On the other hand, they have a great dislike for the petty restraints of military discipline, they are remarkable for their dirty and ill-ordered habits, and they are very lazy. Moreover, their pride of race and their love for their native hills has always been represented, and with much truth, as a reason for the complete failure of the Bombay army in its efforts to attract them to its ranks. But the three cavalry and three infantry regiments, which are localised on the Biluchistan frontier, have hardly given the Biluchis a fair trial. In the first place, these regiments serve two thirds of their time in the plains of Sindh, a climate as distasteful and trying to the inhabitants of the neighbouring hills, as Quetta is to the down-country sepoy. Secondly, neither the officers nor the composition of the regiments have ever been sufficiently congenial to tempt the wild Biluchis from their mountain homes. The Sindh regiments are not a distinct frontier force like that of the Punjab, their officers come and go, are transferred and promoted to and fro between them and down-country regiments, and, accustomed to the docile Hindustani sepoy, they have not the sympathy with the frontier tribesmen, which exists between an officer who has spent his life in a frontier corps and his Pathan soldiers. Nor was any effort originally made to fill the ranks of the Sindh regiments on the spot; they are composed for the most part of down-country men, and any Biluch who enlists in one of them finds himself amongst comrades whom he dislikes, and to whom he is as much a stranger as if he had entered any distinctly down-country corps. The best authorities agree in the opinion, that the objections of the Biluchis to soldiering in our regular army are by no means insuperable; the last few years have seen them brought daily into closer intercourse with us; the Bolan and Harnai railways, the military road to Dera Ghazi Khan, and our establishment in the Zhob valley, have all brought their country more nearly within our sphere of influence. With them, as with many of the wilder tribes of Pathans, this increased familiarity should go far to reduce their aversion to our service; in short it may well be hoped that the experiment, which is now being tried, of a regiment localized at Quetta, may be successful enough to warrant further attempts in the same direction; and that an intelligent effort by specially selected officers, who are prepared to take the Biluch tribesman as they find him, and who will not be too eager to polish his buttons or pipe-clay his belts, will at length open to us a supply of valuable material, which has long been coveted, and which, once rendered accessible, will not quickly be exhausted.

New material.

The perusal of the foregoing pages will have shown, that much of the new material which is ready to hand for the increase of the Bengal army, or to take the places of its worn out parts, is to be obtained by a more ample resort to some of the races, which are already partly represented within it. The one source of supply which yet remains to be noticed, and which is as yet entirely untried, is to be found in the mountain tribes, apart from Biluchis, on and beyond our western frontier line. The Brahnis are a hardy, pastoral race, to whose virtues Sir Charles MacGregor and other writers have done justice; their value, if they can be induced to enlist, can hardly be doubted, and the difficulties in the way of their enlistment are no other than those which have already been noticed in connection with their neighbours the Biluchis.

Nor need we stop here. The value of attaching the trans-frontier races to our interests by enlisting them in our regiments has already been noticed. In no case would this be greater than in that of the Ghilzais and Duranis, nor would any tribes furnish us with finer fighting material. Were the opposition of the authorities at Kabul removed, the number of recruits of either class would practically be unlimited, and even under the present circumstances, a distinctly local corps, with some company or troop commands judiciously bestowed on men of family and influence, should be able to produce a supply, more than equal to the demand, of those trans-frontier tribes. For irregular cavalry the Duranis would be specially valuable, and would probably be attracted without difficulty to that service.

We may now bring our review of the fighting material of the Bengal army to a conclusion by a brief summary of the above. Of the twelve classes which we have discussed, one only, the "other Hindus" of official classification, has been entirely condemned; while Brahmans and Hindustani Mussulmans have been recommended in but small numbers. The Rajputs already in our ranks can be replaced by equal numbers, but of more genuine stamp. The remaining classes are all valuable, but while we must look for no increase, rather for a gradual decrease, of our supply of Sikhs, the Gurkhas, Gurhwals, and Dogras are all capable of meeting some slight additional call; Punjabi Mussulmans and Jats of Hindustan can both supply us with greatly augmented numbers of soldiers of rare merit and value, and finally our north-west and western frontiers offer an entirely inexhaustible field, where we are only limited by the inadvisability of allowing any class or race to assume too great a predominance in our army.

The Madras army.

Preliminary.

No one can consider the question of the efficiency of the Madras army without being struck very forcibly by the unsatisfactory footing on which it at present stands. It is but too much the fashion to dismiss the subject with a contemptuous condemnation of the whole force, or with a grudging admission that it is good enough for what is required of it, namely garrison work. But this is hardly a proper or intelligent spirit in which to criticise a part of our military system, which, it should be remembered, figures to no small extent in the expenditure of the not inexhaustible Indian revenues. Surely, if it is necessary to maintain an army in the southern Presidency, it is equally necessary to maintain it at the highest pitch of efficiency; nor is money spent on a useless article any the less wasted, because it is expended at the southern extremity of India, than it would be if spent in the Punjab. Granted then, that an army in Madras is a necessity, is the army as it now exists there the most efficient procurable? Beyond a doubt it is not so. But if it be renovated and reformed until we obtain the very best article that can be produced from the material at hand, will it even then be worth its cost? In short 'Can any good thing come out of Nazareth?' Equally without a doubt we may reply in the affirmative; we do not require to go back a hundred years to the oft quoted deeds of the so-called 'Coast Army', to prove that the Madras soldier can work well and fight well when he is at his best, when favorable circumstances and a favorable training have given him that *sine quâ non* of all good soldiery—a pride in his profession and his corps, and a little wholesome self-conceit founded on the consciousness of praise honestly merited and gained.

But to get an army like this we must obtain, as our subject says, the best material for soldiers. Let us examine the material of which the Madras army is composed, and see what portions of it come up to our requirements, and how far they can be improved upon.

The principal classes in the Madras army are Mussulmans, Telingas, Tamils, and "other classes," which may include native Christians, and low castes; the Brahmans, Rajputs, Mahrattas, and Eurasians are but a small fraction of the whole, and may be dismissed in a few words.

The last named serve only as buglers, trumpeters, or bandsmen; they are some 400 strong, nor is their increased employment feasible or desirable.

The Rajputs and Brahmans are almost all from northern India, and are unfavorable specimens of their classes as a rule, the latter especially often combining the trade of the money-lender with the profession of arms. The Brahmans number about 250, the Rajputs upwards of 700.

The Mahrattas, of whom there are about a thousand, the larger proportion being in the cavalry, are also not indigenous to the Presidency, and their characteristics may be discussed hereafter with the Bombay army.

Mussulmans.

With the exception of about 100 men, the Mussulmans in the Madras army are natives of southern India; they numbered last year 11,156, and besides their numerical importance, they have always been regarded as the military class *par excellence* of the country. Of them the cavalry is almost entirely composed, while there are upwards of 300 in every regiment of infantry; their language is the recognized language of the army, and they share with the Telingas the advantage of supplying the majority of the native officers.

But the Madras Mussulman of to-day is very far from being as valuable as his ancestor who fought for Tippoo Sultan, for Lawrence, or for Dupleix. As a race perhaps no more striking example can be found of the stunting and stagnatic effects of Islam. Hating manual labor, taught by his religion to avoid the learning which would advance him in the world, the Madras Mussulman looks on soldiering as an easy means of attaining a competence; but the love of adventure and strife exists no more, and he retains little but the vices of his vagabond ancestry. Yet to condemn the Mussulman class is to condemn the whole of the Madras cavalry, which is generally regarded as the most efficient branch of the Presidency army. It must, however, be borne in mind, that whereas the Mussulmans of the infantry come to a large extent from the Telinga district, and partake in full of the unwarlike characteristics of their Hindu fellow-countrymen, those of the cavalry are enlisted from the Tamil districts of the southern and central Carnatic and from Mysore; and they belong also to families, which, while supplying for generations recruits for the cavalry, have retained much of their warlike instinct as well as a social superiority to their co-religionists among the foot-soldiers. It is many years since the Madras cavalry had an opportunity of showing what is its value, for skirmishes in the jungles of Burma can hardly be regarded as such; but individual instances of personal bravery lead us to hope and believe, that if the occasion offered, these regiments would not be found behindhand in proving their efficiency. Of the Mussulman infantry, however, it is to be feared that their numbers might be reduced without serious loss to the army.

Telingas.

Next to the Mussulmans come the Telingas, or Telegus, in point of numbers and importance. Indeed this class has of late years almost usurped the hereditary position of pre-eminence occupied by the former. The reason is not far to seek. From the Telingas, more than from any other class, has the Madras sepoy earned that reputation for docility, which we hear quoted on every possible occasion by his friends, until we begin to tire of this rather mawkish line of advocacy. But the Madras army has in the last sixty or seventy years had so little chance of joining in real, tough fighting, that it can hardly be wondered at if its officers begin to think more of the qualities which shine in the quiet life of cantonments, than of those which are requisite for the battle-field.

The Telinga is an excellent soldier in cantonments; clean, quiet, and docile, he makes up in willing obedience for what he sometimes wants in cleverness, and wins his way to promotion by sheer lack of devilry. Whether he can be called a good fighting soldier is, however, unfortunately, doubtful, and it is to be regretted that the class has gradually become so numerous in the army that any extensive reduction of it must cause much discontent and hardship. Yet it cannot possibly be called the 'best available material for soldiers,' and though the regiments in which it is predominant are often the smartest and best turned out, it cannot be pretended that they might without danger be employed against any enemy whose fighting qualities were more than inferior.

Tamils.

We have thus in the two preceding paragraphs been obliged to confess, that of the two classes which form by far the largest proportion of the Madras army, the first is only partly trustworthy, and the second entirely valueless for use in the larger operations of the empire. How then is that force of increased efficiency, of which we spoke just now, to be obtained? First of all from the class now before us, and which, though acknowledged by all authorities to furnish some of the best fighting material in the Presidency, has nevertheless been suffered to gradually fall into disuse, until its members number now but two thousand in a force of near sixteen times that strength. The Tamil is as a rule inferior in appearance to the Telinga; he is thin and wiry, often very dark-complexioned, and while generally quiet and orderly enough, he is inclined to be slovenly in his habits and untidy in his dress, especially if of an inferior caste. At the same time he is a hard and willing worker, and has proved himself as good a fighting soldier as he is well-behaved in quarters. The Queen's Own Sappers and Miners is a corps, whose name has been long familiar for the excellence of its work; and the behaviour of its men on many occasions, of which the most recent, and perhaps the most trying, was at Tofrek in March 1885, has elicited the highest praise from every quarter for their exceptional steadiness and bravery; and though it is true that a large number of that corps are of other classes, yet it is equally true that the best soldiers in it, whether for work or fighting, are the Tamils. The same remarks hold good of the other corps which possess men of this race in any large quantity. They are only two or three in number, the Pioneer corps standing foremost among them; experience has proved them to be the most valuable regiments in the army, while their Tamils are their most valuable men. How then, it may well be asked, has it happened, that the employment of Tamil castes has been allowed to gradually lessen, until their number has reached so low a figure that they are but an insignificant fraction of the army? It is not that years of peace have rendered military service distasteful, it is not because their prosperity has increased, and while the reward of civil labor is far in excess of what it once was, the wages of the sepoy remain unimproved: each and all of these reasons have doubtless had their effect on recruiting, and have assisted in damping the ardour with which military employment was formerly sought for; but the true secret of the failure in the supply of Tamil recruits lies in the system of mixed companies. As we have seen, the Tamil, though hardworking and often more intelligent and quick than the Telinga, is inferior to the latter in physical growth, and in cleanliness and smartness of appearance; thus the less manly race gradually acquired, together with the Mussulmans, almost a monopoly of appointments and promotion. No one who has any experience of the natives of India can gainsay the assertion, that a man in authority will favor those of his own caste in any way in his power, whether it be in recommendations for promotion, in protecting from punishment, or in any of the numberless petty details which go to make up the soldier's daily life. Little by little the Tamils found themselves ousted and supplanted by their Telinga comrades; first one regiment, and then another, became unpopular with them on these grounds, until the state of things which we have just noticed, resulted, and only those corps remained to offer a favorable career to the Tamil soldier, in which the necessity for constant labor has caused the good workman to be preferred to him, who though of a more taking exterior is intrinsically of far lower value.

Here then we have a class, which, instead of being one of the smallest, should be the predominant element of the Madras army. Let class companies, or better still, class regiments, be raised of Tamils only, and it will soon be found that the military life still possesses enough attractions to supply recruits amply sufficient to meet all requirements. The Madras Sappers and Miners, as we have already noticed, is a corps which yields to none in India, not only in its value as workmen, but also in the steadiness of its courage; and in no way inferior to that corps will be a regiment of Tamils, well officered, and taught to look on the fact of their race as a sufficient passport to their employment wherever the needs of the empire demand; trained in fact in the two great essentials of a good soldiery—pride of race and of regiment.

Other castes.

Much of what has been said of the Tamils applies equally well to the Pariahs and other Hindu classes, as well as to native Christians, all of whom we may now consider together. The last named generally belonged to the outcast ranks of society before their conversion, for Christianity, of the most debased nature, takes the place in Madras of Islam in northern India, and forms a sort of refuge for the lowest clases. Moreover these Pariahs are almost all of Tamil race, and possess many of the favorable characteristics of the caste man of that class. At the same time the Tamil failings of untidiness and slovenliness are naturally seen in a greater degree in the lower ranks, and are often coupled, especially in the case of native Christians, with a taste for strong drinks and the attendant evils of brawling and gambling. In the Sappers, in which there are a great number of Pariahs, the constant work, coupled with the supervision of British non-commissioned officers, tends to render them steady and industrious, and to eradicate their bad habits; while their readiness to eat animal food is of course of immense advantage in a corps which may be constantly called on to undergo exceptional hardships and fatigues. But in regiments of the line the comparative idleness gives the undesirable habits of the Pariah classes ample opportunity to increase and to multiply; and under these circumstances we can only conclude that their enlistment in any but pioneer regiments is undesirable, except in very limited numbers.

New material.

Having thus glanced at the classes now represented in the Madras army, we may consider what chance there is of supplying the place of some of the rejected material from new sources. There are in the Presidency three races whose employment in the army has often been discussed, but never given a serious trial: they are the Mapilahs and Nairs of Malabar, and the Coorgs.

Mapilas.

The Mapilahs are the descendants of Arab settlers on the west coast by their marriages with low-caste Tamil women, and they constantly receive new blood by by the conversion of the low-caste Hindus of Malabar. They are a somewhat remarkable race, retaining in a great degree the attributes of their Arab forefathers; wiry and athletic, independent and brave, but quiet and law-abiding, except when aroused by fanaticism, when, as the history of the *émeutes* in those districts shows, they can fight with all the fiery devotion of the Arabs of the Soudan.

Nairs.

The Nairs, a Tamil race, formerly the undisputed masters of the country, are of splendid physique, and surpass in this respect all the other races of southern India. But although up to the close of the last century their reputation for courage was great, it appears that they must be included among the peoples on whom the Pax Britannica has had a deteriorating effect, for at the present day little but the reputation of their past greatness survives, and although their physique remains unimpaired, their martial spirit is wanting.

Coorgs.

Perhaps the most promising of the three races which we have mentioned is that which inhabits the mountains of Coorg, between Mysore and Malabar. Little inferior in point of stature and general physique to the Nairs, the Coorgs are at the same time a hardy mountain race, delighting in field sports and in out-door life. The history of the campaign which ended in the conquest of the country, tells of sufficient resistance on their part to prove their fighting capabilities; while their loyalty to our rule since that time has been so remarked, as to gain for them exemption from the disarmament act.

It must then be admitted, that for the maintenance of a native army in a country like Madras, where the majority of the people are the most unwarlike of the races of India, the possibility of obtaining recruits from two such classes as the Mapilahs and the Coorgs would be of the greatest advantage. But an objection common to both has hitherto prevented the realization of such a project. Both races are extremely averse to any employment which will take them away from their native country; the Coorgs especially are so fond of their mountain homes, that even temporary and lucrative work in the neighbouring plains of Mysore has no power to attract them. But it is not hard to find amongst the races of northern India parallel instances to this, and a remedy for the difficulty. The same course which is now being followed to attract Biluchis to our ranks, which was followed with Sikhs and Punjabi Mussulmans when first we annexed the Punjab, might with equal advantage and probably with like good results be resorted to in Madras. How can it be expected that isolated races, like those in question, will enlist by twos and threes in regiments far away from their homes, and among classes which are always strange and often distasteful to them? But raise a Mapilah regiment at Cannanore, and one of Coorgs at Markara, give a certain number of commissions to men of position in the country, localize the regiments in those districts except in cases of emergency, and it is probable that two valuable corps would in a short time be obtained, which would pave the way to the further employment of those races, and which would after a few years of military experience, be as ready to serve in various parts of the Presidency as the Pathan is to leave the frontier.

Karens.

Finally, there may be said to be a chance that some of the garrison duties now performed by the Madras infantry in Burma will in time be taken by local corps composed of natives of that country. After the annexation of Upper Burma there was a general expectation that the Karens, and perhaps the Shans, of the eastern frontier, would afford good material for regiments for general service, and possibly prove not far inferior to the Gurkhas, whom the former often resemble in their physique. The members of the Bombay-Burma Trading Company, and of the Irrawaddy Flotilla Company, who were almost alone in their knowledge of Upper Burma and its people, drew graphic pictures of the fearless security with which a party of a dozen Karens would take two or three valuable elephants, laden with costly merchandise, through the wildest and most lawless districts of Burmah, safe in the knowledge that the boldest dacoits of the country dare not attack them. But a more accurate knowledge of these peoples has shown that such stories give a very exaggerated idea of the valour of the Karens, while the Shans are quite as useless as the Burmese for military work. Major Barrow, who has given the subject some attention, says that even the former race will never make real soldiers, though the Red Karens might be utilized, like the Bhils, for local corps. Where, however, the supply of good material decidedly falls short of the demand, as in the case of Madras, anything which may help to husband that supply and keep it available for use in emergency in any quarter, is again not to be lightly disregarded; and if two or three regiments of Red Karens can be obtained to adequately perform the garrison duties of eastern Burma, it is so much saving of military material which may be employed elsewhere, and a proportionate gain to the army.

Conclusion.

It may be readily gathered from what has been written of the Madras army, that no increase of that force is feasible, nor indeed is it likely that such a step will ever be necessary or desirable. The difficulty which has to be faced is the keeping up of such a force as is absolutely necessary, without having recourse to races which, in the most stormy times of Indian history were never anything but peaceful and averse to the perils of war, and which a hundred years of unbroken quiet have not rendered more eligible to follow the calling of a soldier.

For the garrisoning of Madras and Burma there are now, including the Burma infantry, 32 regiments of infantry: the work could probably be done by 30. Towards that number four are already supplied by the Punjab, and the resources of upper India are equal to furnishing two more without difficulty; two local corps of Karens would go far to complete the native garrison of Burma. In the Presidency itself the work of the western districts could be undertaken by two regiments of Mapilahs, with head-quarters at Cannanore and Mangalore, one of Coorgs at Markara, and one other corps at Quilon; the caste Tamils could well supply six full regiments, while three more might be formed of the outcast Tamil classes and of Mussulmans, care being taken to enlist these latter from Tamil and not from Telugu districts. Thus we have 20 regiments without touching the class which now furnishes more than a third of the army. The remaining ten corps should be avowedly kept for merely garrison work at Madras, Rangoon, Bangalore, Bellary, and other stations, where a military garrison is necessary, but where it would never be called on to perform more serious work. These regiments might be formed, as now, of mixed classes, the Telingas predominating; and the orderly habits and unadventurous spirit of the latter would eminently adapt them for such duty. The Tamil corps, on the other hand, would be sent on any active service which offered, either on the Burma frontier, or, if possible, occasionally in northern India; they would be taught to look on themselves as the fighting element of the Madras army, and would thus acquire an *esprit de corps* which would help them to bear themselves well in the day of trial.

By some such means as this there would, at any rate, be an efficient garrison in the wild districts of the eastern frontier, in the place of regiments whose men, we are constantly told, inspire rather contempt than awe in the breasts of the inhabitants. Moreover, we should have another third of the Madras army ready and efficient enough to join their comrades of the other Presidencies in the defence of the empire. Whether the garrison regiments could not spare some of their officers for the benefit of those composed of more efficient material is a question which does not enter into the present subject. Our object has been to show how the fighting resources of the Presidency can best be developed, and how the best material available for soldiers can be obtained and used for the benefit of the state.

The Bombay army.

Perhaps it is more difficult to put forward any scheme for improving the material of the army of Bombay than to make a similar attempt with either of the other Presidencies. Indeed, although this force is divided into no less than thirty-one different headings in the caste return, yet of these only one class of any importance, the Mahrattas, belongs exclusively to the Presidency. It is, in fact, a distinctly alien army and it is difficult to discover how it can be otherwise.

The recruiting regulations gravely state that "foreigners" to the extent of 150 per corps, Punjabis included, are authorised, provided that 50 are Beluchis, or inhabitants of southern Afghanistan." That is to say, a total of 3,300 'foreigners' and 1,630 Beluchis for the whole of the infantry and cavalry. But what do the returns show us? Not less than a total of 10,400 'foreigners' in those two branches of the service. Truly never was rule more entirely, more ridiculously, a dead letter than this. And yet the absorption by Bombay of these ten thousand men from the fighting races of northern India is not felt by the army of Bengal; so immense is the supply, that every part of the empire can leaven its forces with the coveted material and more than enough remain for use on the spot. Nor, if the foreign element in the Bombay army be reduced to the limit laid down in the regulations, is it easy to discover whence good material can be obtained to take its place.

This being the case, it would surely be much better to recognize and acknowledge the fact; let it be granted that one third of the army, that is to say about 8,800 men, may be composed of 'foreigners' including Biluchis, and let those classes only be closed to enlistment, which show signs of limiting their supply.

However, we have now but to consider facts. Ten thousand of the Bombay army, which totals under twenty-seven thousand, are members of those castes and races which we have already dealt with under the head of the Bengal army. All that has been said there regarding Jats, Rajputs, low Hindu castes, as well as of the various classes of the Punjab, is equally applicable to the present case, nor need any of it be repeated. Of the many and various castes which remain, the Mahrattas alone require any detailed notice; the Deccani Brahmans, Telingas, Parwaris, Christians, Jews, and others, are too few in numbers to be separately of much importance; though it may be said of them generally that their value as soldiers is not excessive.

Mahrattas.

Although the Mahrattas form the largest class in the Bombay army, numbering over 7,300, they have lost the predominance which they held in the earlier years of the century, and, especially in the cavalry, are neither sought after nor enlist with the eagerness of former days. When we remember the reputation of the Mahratta horse in the wars of Lake and Wellesley, we cannot fail to be surprised that seven regiments of Bombay Cavalry, as well as the Governor's Body Guard and the Aden Troop, only include a total of 368 of this race. But a more careful examination will show that even in his best days the reputation of the Mahratta was an exaggerated one as a soldier. To pursue the beaten foe, to hang on the outskirts of a retreating army, plundering baggage trains and cutting off stragglers, no cavalry was cleverer or more mobile than the undisciplined clouds of Mahratta horsemen, and this was amply proved during Colonel Monson's disastrous retreat to Agra in 1804: but we have as high an authority as Colonel James Skinner for distrusting their value as trained cavalry even sixty years ago, when the race had not yet forgotten their traditions of war and victory of the latter part of the last century.

On the other hand, although neglected in the cavalry, the Mahrattas have proved themselves excellent infantry soldiers, and they form the predominant class in every infantry corps; nor is the fact without significance, that some of those corps which have the greatest number of the race are among the best in the Bombay army. Of these, the 28th Pioneers, which has shown itself second to none in the field, has 385 Mahrattas, while almost the whole regiment is composed of the races of the Bombay provinces. On the whole then it seems that this class is still able to furnish material which will prove valuable as native soldiery, and which may with advantage be employed under any circumstances; nor are its numbers likely to fall short of the demand.

Of new material for the Bombay army there is no available supply which promises well, except that from Biluchistan and southern Afghanistan. This has already been discussed, and but little remains to be suggested. The Bhils have shown themselves, in the Bhil corps, good soldiers for local work, and are a hardy, vigorous race; it is possible that another regiment or two of this class might prove useful for garrison duty, but it cannot be expected that they would ever be of value for active service in the defence of India.

Finally, let us again emphasize an assertion, which has already been repeated in dealing with Madras and Bengal, namely, that those are the best regiments, in which *esprit de corps* is strongest, and this will be found above all others in caste regiments, least of all where the number of classes is greatest. Make one class predominant in a corps, and the best men of that class will seek to serve in it; on the other hand, let it be known that a man will meet soldiers of every denomination in a regiment, and that he and his fellow caste-men will constantly have to struggle against rival classes for promotion and advancement, and its unpopularity will be assured: none but the dregs of every caste will seek employment in it. We have mentioned one of the best regiments in the Bombay army, which is distinctly a Bombay corps, and in which Mahrattas have a large preponderance; another regiment might be cited, which has of late years gained an unenviable notoriety for its inefficiency and constant and flagrant ill behaviour, in which nineteen different classes are represented, and the most numerous of them numbers 160 men.

Conclusion.

Recruiting in general.

On several occasions in the foregoing pages reference has been made to the necessity of improving the regulations regarding recruiting, in order to get both greater numbers and a better class of men; and perhaps a few words of explanation will not be out of place, to show how measures of this sort may go far to increase the quality and quantity of the supply in many cases, where the military spirit of the class is thought to be dying out.

In the first place, as regards recruiting agents, there can be no doubt that the employment of British officers on recruiting duty would often have a most beneficial effect, both in giving importance to the party and smoothing over the difficulties of preliminaries. But as only officers well acquainted with the language and peculiar characteristics of the class from which recruits were required could be employed on such duty, the plan could never be extensively carried out in regiments which have representatives from several widely different races. The next best arrangement would be the formation of recruiting centres, which should be as numerous as possible; in charge of each should be an officer, specially selected for his knowledge of the language of the district, and of the characteristics of the people, and for his appreciation and tact in the management of native character. In the cold weather he might make tours through the neighbouring districts, accompanied by a small staff of sharp and smart non-commissioned officers, and using such small display of importance as would be likely to attract the youth of the villages he might visit; in this manner he would be present at the principal fairs and gatherings of the neighbourhood, and would enlist recruits as he moved from place to place, subject only to a medical inspection on arrival at head quarters. The recruits and their friends would thus be spared the tiresome and expensive delays attendant on the present eminently unsatisfactory system, while commanding officers would be saved the constantly recurring trouble of receiving from distant stations recruits who are unfitted for their regiments. Each recruiting officer would thoroughly understand the class of men required from his district for the different branches of the service, and would take a pride in obtaining the best possible material.

The second point relates to the recruits themselves, and is ably treated in a note by Brigadier-General Sir John McQueen in the United Service Institution Journal, No 83. Granted that the present system be in some way reformed to avoid the many annoyances and hindrances which now meet the man who wishes to bring up one or two of his friends for enlistment, there must still occur some delay which is unavoidable. During this time the recruit should be treated with a liberality which will be of little actual cost, and that far out-weighed by the result. As suggested by General McQueen, some place of lodging should be provided for them, and in the winter they should be supplied with a little warm clothing and a blanket, while recruiting parties on the Nipal frontier should be given sufficient quinine with which to supply batches of recruits while passing through the Terai. In time of war when recruits are required in any numbers, they should be sought for with as much parade and pomp as possible, in order to arouse that martial enthusiasm which is more effectual than high pay or pensions in filling the ranks of an army. Above all, and at any time. two objects should be aimed at, the avoidance of delay, and the sparing of expense to the recruit and his friends.

Finally, let us bring these pages to a conclusion in the same manner as we opened them, by insisting on the magnitude of the subject. We have endeavoured, however imperfectly, to follow out the lines which we laid down at starting. The army of each Presidency has been examined in turn; in that of Bengal we have found much material still undeveloped, much of that which has served us before still available and capable of doing us good service in the future, while a rich mine of wealth lies yet untouched among the hardy mountaineers of our frontier. In Madras we have endeavoured to show, that not only can the Presidency supply a force ample for its garrison work, but that regiments can be obtained thence of far better fighting material than any which has served in its army during the last fifty years. Burma and Bombay both look to the "Great North West" for recruits to supplement their own resources, and while a proportion of good fighting material is to be obtained from the latter, the fighting races of northern India are equal to the task of assisting to fill the ranks of the western Presidency.

Accurate and elaborate statistics have been avoided; it has been said that statistics prove nothing, and indeed it is difficult in a question like the present to estimate in figures the exact number of fighting men which may be obtained from any one class, the exact supply required under various contingencies, and the value of the supply when obtained. Rather we have attempted to give a general view of the races which make up the army of India, their merits or defects, and the chances of their supply falling short of the demand for them, or otherwise. Writers on military subjects are, perhaps, more prone than any others to fall into an extreme of pessimism, or the reverse; at the present day the pessimistic school is in the majority, and we are often told that we have not half-a-dozen native regiments in India which are fit to meet an European foe. May we hope that we shall not be thought to err too much on the side of optimism, when we express the conviction that an army, which can from its three several parts produce three corps that will fight as the 15th Sikhs, the Madras Sappers, and the 28th Bombay Infantry, fought at Tofrek, is capable of taking its place in the front line against any power which may dispute the supremacy of the British in India?

SECOND ESSAY,

By Lieut.-Colonel M. J. King-Harman,
2-4th Gurkha Regiment.

"Forward."

It may be well to commence by stating that in the opinion of the writer there is no conclusive proof that the much maligned "Pax Britannica" has in any way reduced the warlike spirit of those warlike races which have hitherto been enlisted in our Indian army; but there can be no do doubt that it has brought so much prosperity, ease, and comfort to them, that an honest and a comfortable livelihood can be obtained now on far easier terms than was formerly the case. Cultivation has very much increased; railways have opened new markets for the produce of the land; lucrative appointments in India, in distant settlements, and in Africa, draw away many of the daring spirits; and finally, over-education, which has proved a curse rather than a blessing, has raised in the minds of the mass of our Indian population a belief that they are fitted for better trades than that of soldiering: a feeling which makes them an easy prey to the numbers of mischievous agitators who now abound in all parts of the country, and which is causing an amount of dissatisfaction and discontent which it is not pleasant to contemplate, and which will surely lead to very serious results for us in course of time.

If we would only bear in mind the fact, that our native army is a "*mercenary*," and not a "*patriotic*" army, and would act accordingly by adding to the pay and comfort of the soldiers as the prosperity and independence of the country increase, so as to enable them to be on equal, or even on better terms than their brethren in civil life, we should never have any difficulty in filling the ranks with as good men as we ever had before, without in any way interfering with other callings. It is not by any means the case that the pay of the army remains now the same as it was formerly; on the contrary it has been indirectly, and also directly, considerably increased of late years; but at the same time much more is demanded and required of the men than can be compensated for by such an increase. The labourer is everywhere worthy of his hire; and he knows it too, not only in England, but also in India. Have we not taught him that ourselves? And if we want the youth of India to set aside the ploughshare for the sword, we must commence by making the service of the latter more paying and therefore more attractive, than that of the former. That is the businesslike and indeed the only way of looking at the matter.

It is all nonsense to urge—as too many do, that the country cannot afford to pay more for its army than it pays at present: it can do so, it must do so, if it is to remain in our possession; and what is more, it will do so some day, but if that day is put off too long, it may come too late; therefore the sooner we fix it, the better it will be for us as a nation, as well as for the millions in India who are now under our care.

The warlike spirit undoubtedly remains unchanged amongst the warlike races, but it has not been fostered by us as it should have been, which is perhaps not much to be wondered at, considering that we are essentially a mercantile nation, invariably counting the present cost without ever looking to the future, and that anything savouring of a warlike or aggressive character is sternly suppressed on the plea of needless expense; the consequence of which is that our navy and our armies are in a starved, neglected condition. Moreover we have no fixed policy of any sort, but are for ever changing. Many years ago the Russian nation, in the person of Peter the Great, resolved that some day they would take India, and ever since they have been working steadily towards that end; had we then as firmly resolved that we should keep India for ourselves, and had we as a nation firmly adhered to that resolution, regardless of "party," we should not be crying out now.

What have we done towards fostering a warlike spirit amongst the races of India? Very little; in fact many would say nothing. Why is it, that for more than 20 years after the Mutiny, we persistently ignored the fact, that by enlisting thousands of men belonging to *unwarlike* races, we were endangering the safety of the empire, and were storing up trouble for the future?

There are many who can answer that question, but there are few who will do so. However, now that the fact has been thoroughly realised, it behoves us to take much serious thought as to the best means to be adopted, so as to avoid rushing hastily into further mistakes; and the thanks of the country are surely due to the Council of the United Service Institution for inviting the opinions of all officers on such an important subject as the recruiting grounds for the future for the Indian army.

Supposing, however, that it could be, and was proved, that the warlike spirit had deteriorated amongst any of the old fighting classes, why should we try to shift the blame from our own shoulders, and to accuse the "Pax Britannica" for it? Have not we at different times and in many ways done sufficient to destroy it entirely? Now-a-days everything connected with the native army is being treated in a constantly increasing spirit of liberality and common sense? the true value of the army, and the real reason for its existence, are at last acknowledged and recognised. It is now clearly understood, that the old idea that safety consisted in mixing all classes and creeds together in one regiment was a most dangerous and foolish one, inasmuch as it directly implied distrust of all.

It seems as if a species of madness had seized our military authorities at different times; for how otherwise is it possible to account for the treatment of the native army during the decade previous to 1857, which brought about the Mutiny, or for the helpless sort of way in which that army was re-organised, and replenished, by enlisting thousands of useless men, or rather I should say, of men who were well known to be useless as soldiers?

To mix in the same regiment or battery men of different creeds and classes shews a complete want ot knowledge of Asiatic human nature, and may be compared to the mixture, or attempted mixture, of many different kinds of hard metals in the manufacture of a sword. You make for yourself a dangerously unreliable weapon, the several parts of which have no natural affinity for each other, and when the day of trial comes, it flies to pieces for the simple reason that it cannot hold together.

It may be urged, that Hindus and Muhammadans have repeatedly fought side by side in our ranks without detriment to the cause for which they were fighting; and that is not denied, but they would have fought much better if they had done so separately, unhampered by those unavoidable feelings of jealousy, distrust, and dislike, which are inseparable from such a mixture. In order to foster the warlike spirit, we must enlist only men of the warlike classes and tribes which abound within our border and also outside of it, and we must collect them into separate regiments by themselves.

The lecture given by Colonel Lance, in August last, was a valuable commencement of this important subject;* and some of our most experienced and distinguished soldiers took part in the subsequent discussion, but the information given was necessarily of a fragmentary description, and contributes very little towards a satisfactory solution of the main problem. It will be necessary, however, to refer to it occasionally in this paper.

The main object of our native army, in these days, is to assist our small force of British soldiers in safe-guarding India, in preserving intact the only land frontier of the empire, and in carrying the war into the invader's territory; and the strength of that army must be such, that in the event of invasion a sufficient force may remain behind to suppress any outbreak which may occur in India itself; and no man should be enlisted who is not fit for those duties. Much has been done during the last few years towards eliminating useless rubbish from the ranks in the shape of men enlisted from unwarlike races, who ought never to have been called soldiers, and so far as the Bengal army is concerned, the regiments are now composed of good fighting material; but it seems probable that still more improvement may be needed in the others Presidencies.

In the following observations and suggestions, each army will be taken separately, commencing with that of Bengal. As in England, so in India, the quality of the raw material depends firstly and almost entirely on the amount of compensation given for service demanded and rendered. Then, supposing that part of the question to be settled in a satisfactory manner, a high standard can only be maintained by carefully fostering that feeling of slow growth known as "*esprit de corps*," invaluable in any army, and which in the case of India may in time become almost as powerful a force as real patriotism.

Without doubt "*esprit de corps*" ran high in many of the old native regiments; it was clearly apparent in many of the Punjab regiments during the Mutiny; and it exists still to some extent in the

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* See No. 83 of Journal of United Service Institution of India, 1891.

Frontier Force, and more strongly in those regiments composed entirely of Sikhs and Gurkhas; but the real feeling, the real pride of race, and pride of regiment, that undefinable feeling of superiority, self-esteem, and "*camaraderie*," which holds men together in the presence of any danger and carries them forward as one man against anything and everything, can only be obtained and preserved in "class" regiments. Race jealousy alone must promote that feeling in "class" regiments, whilst it must and does weaken the efficiency of mixed regiments by rendering cohesion impossible. Every Muhammadan in a Sikh regiment is an element of discord.

It is no argument to point to many of our mixed regiments that have done splendid service. I maintain that they would have done still better, if they had been composed of men belonging entirely to one class.

Many who are opposed to this view entirely overlook the fact, that for the most part the officers who raised these corps were amongst the finest that the world ever saw, whose names were known in every village, and whose influence is felt to this day. They also appear to forget that the circumstances under which regiments were raised in those days, were totally different in every way to those now existing or ever likely to exist again.

If we want men of warlike races to enter our service and to remain in it; and if we want to make the utmost use of them, we must re organize the army into "class" regiments. It will be a work of time perhaps; but it certainly will not be one of difficulty; on the contrary, most regiments being now composed of mixed class companies, it would be a simple matter of transferring entire companies from one regiment to another. Without wishing to make any comparisons, or to under-rate in any way the services of others, I may state my firm belief that no mixed regiment could possibly have held together in the way that the 15th Sikhs did, when they were left to cover the retirement of the reconnaissance, on the day before the battle of Kandahar; the requisite amount of self confidence and mutual self reliance would necessarily be wanting.

When Colonel Lance told the true and touching story of the village maidens of the Manjha, he was talking of the Sikhs as a nation; the teaching of that story does not apply to the present day, but still it may be questionable whether the military spirit is any less now amongst them than it was then. There is occasionally great difficulty in obtaining good Sikh recruits for some of our regiments, but any number were forthcoming when they were wanted for the Burmah Military Police, magnificent men, mostly "Jats", the majority of whom will probably never live to see their homes again. With what eagerness too do they come forward for police work in Hong Kong, Perak, and other places—all which appears to point conclusively to the fact that it is not degeneracy, but insufficiency of pay, that keeps so many away.

Here I would venture to suggest that all such police work could be performed just as well, if not better, by Ahirs, or Gujars, or men of other well-known castes, that are not now enlisted for the army; but owing chiefly to the fact, that cattle are the only animals from which meat can be obtained throughout the greater part of Burmah, I am of opinion that none but Muhammadans should be employed in that country.

Sikhs.

We have now nine so-called Sikh regiments of infantry in the Bengal army, and we ought to have three more, all of which should be composed entirely of Jat Sikhs, though one composed of "Lobanas" might be allowed; but on no account should the two castes be mixed in any regiment. There would still remain in the Punjab sufficient Sikhs to form several more regiments, which will be noticed hereafter.

Colonel Lance said that "the experience of the past shows the "wisdom of employing men whose homes are beyond our control, only "in limited numbers, and under special precautions"—but in regard to this view I would point to the Gurkhas, who, for all round work may be considered to be almost equal to Jat Sikhs; it must be admitted, however, that special precautions are necessary, though not more so in the case of men living beyond our control than they are in connection with our own subjects. It is not always possible to send British officers on recruiting duty, but whenever it is not absolutely impossible to do so, it should be a standing rule to send one on this most important work, and previous to as well as during the time he is so employed, he should be in constant communication with the nearest British civil officer. Such is the chief precaution which should be insisted on by government. Experience has proved the necessity of adopting careful precautions in the performance of this duty.

Gurkhas.

Now for a few words about Gurkhas, of which we shall soon have 13 battalions. Thanks to the urbanity of the present durbar of Nipal, we have been able during the past few years to raise five entirely new battalions, and another is in process of being raised; besides which the three old Assam regiments have been made into Gurkhas. The very large number of undesirable men who presented themselves for enlistment, some of whom succeeded through fraud in getting into our service, caused careful enquires to be made regarding the capabilities of that small country to supply and maintain so many battalions with efficient soldiers of the proper stamp; and the result tended to confirm the already expressed opinion of competent judges, that in order to maintain a high standard in all regiments, it will be absolutely necssary to tap the country systematically by recruiting at four or more separate points on the frontier, instead of at one only as has been hitherto the rule, although this year a second point has been conceded at Darjeeling. The special precaution required in the case of Gurkhas is, that steps should be taken to avoid all competition between battalions. There are many other classes of men in Nipal that would furnish just as good fighting men as do the "Muggurs," and "Gurungs," when properly disciplined; therefore it seems very desirable that they should be enlisted in larger numbers into the new battalions; thus leaving Gorakhpore free for the five old battalions, and also for the 44th regiment, which has been recruiting there for many years. All western and southern Nipal are practically untouched.

Gurhwalis.

Gurhwal could supply and maintain one battalion, and one if not two, mountain batteries. It seems strange that all our native mountain batteries should be manned entirely by men from the plains of India. The value of a Gurhwali as a foot soldier has been sufficiently proved, and there is no reason to doubt that he would make an equally good gunner. A body of true, loyal, brave, hardy mountaineers would surely be better men for mountain artillery than many kinds of Punjabi Muhamadans that one sees now-a-days. It might perhaps be necessary *at first* to supply mule drivers from Lobana Sikhs, but no other caste of men should be allowed in. It would also be necessary to start with some Sikh or Hindu native officers and non-commissioned officers for purposes of instruction etc.

Hindustanis.

The first 13 regiments of the Bengal army may be well kept as they are, except that they should be all "class" regiments, and there is little doubt that such a change, coupled with the requisite increase of pay, will attract the flower of the magnificent fighting material that exists throughout Oudh and the North-West Provinces. Who will dare to say that finer soldiers can be found, than those who filled the ranks of the old 30th Bengal Infantry, who charged the Sikh guns at Chillianwalla and spiked 10 of them, losing a large number of killed and wounded. They were lead by 17 British officers, of whom one only was untouched. Or again could anything have been finer than the behaviour at Gujerat of the Hindustanis of Jacob's Sindh Horse? The military spirit which imbued those men still lives in their descendants, and it only requires judicious fostering to flourish again as strong as ever it did.

Rohillas.

A "class" regiment of cavalry raised from the once turbulent Rohillas would surely prove as good as the famous Murray's Jat Horse, which itself is second to none.

This leads to mention of that famous race of men known as Jats, of whom there are so many varieties, which requires that special precautions should be exercised in enlisting them Officers who know the Bikanir, Jeysulmir, and Rohtak districts would find no difficulty in obtaining 2,000 men, who in physique and in all real fighting qualifications are fully equal to the best Jat Sikh, the fighting instinct in whom is only dormant, and requires little fostering to shine out again; but they are as a rule so well off that they will not enlist now. If, however, the rate of pay was raised, and British officers were sent into those parts two good Jat regiments could be raised and maintained without trouble; and they would prove most valuable. The recent breaking up of the 38th Bengal Infantry might tell against us at first; that would be only natural, but the feeling would soon wear off, and in course of time, as service in the army became popular, it might be possible to raise a third battalion by working the country as far down as Bhartpur; but on no account should Jats be enlisted from the Delhi or Meerut districts, or from anywhere in the neighbourhood of Agra.

Gujars.

Gujars are not enlisted as such; they have a bad reputation as being turbulent and wild, but for those very reasons, and owing to their splendid physique, I am strongly of opinion that at least two battalions of infantry, and perhaps one regiment of cavalry could be raised from the Muhammadans of that class, and that they would make fine useful soldiers. It is recommended that they be employed exclusively in the Madras army, because there will not be room for them in that of Bengal, but they must be kept in regiments by themselves, and must be given long furlough, and a showy uniform like our present Biluch regiments.

Dogras.

The value of the "Dogras," or hill Rajpoots, is too well known to require any special comment here, and the recent raising of two Dogra battalions was a grand move in the right direction; but still sufficient care has not been taken to enlist the right men *only*, and from time to time many so-called Dogras have been enlisted in the low hills, and even in the plains, who should not be seen in a regiment. Men should only be enlisted from the four well known great sub-divisions of this class, and the Cashmir men should be kept in different regiments to those from Kangra and other places. I am strongly of opinion that men of this class should be entirely withdrawn from all regiments, except the Guides; and that a third corps should be formed as soon as possible.

Punjabi Muhammadans.

The class generally known as "Punjabi Muhammadans" is very strongly represented in our Bengal army; and it is also very frequently met with in that of Bombay. There are many varieties of this class, a fact which is not sufficiently recognised in many regiments, the consequence of which is that large numbers of big, dirty, lazy, chicken-hearted men are enlisted, who are even more useless for real warfare than the Ahirs and other unwarlike classes of the North-West Provinces. Great discrimination is necessary in enlisting men of this class, as chiefly owing to their long servitude under the Sikhs they have deteriorated in some districts to a hopeless extent. Sufficient attention has never been paid to the hardy men from the Salt Range; or to those from the Jhang district, and those almost rainless tracts to be found lying between the foot of the hills trans-Indus and the Jhelum, or between the Chenab and the Ravi. The hard life led by the inhabitants of those districts, produces hardy men who would make most excellent soldiers, more especially if kept together in class regiments, or in corps recruited from Muhammadans only.

Men from British Hazara should never be enlisted in any branch of the service, as they are one and all bad soldiers. They proved false to Abbott and Nicholson, and will prove equally false to any one else.

The Yusufzai Pathans, as well as men from the neighbourhood of Peshawar, should be very sparingly enlisted; they are swaggering, blustering bullies, and look very well in uniform, but they have small hearts, and are most unreliable and treacherous as a rule.* The old Daodputras, who resemble the Multanis, would make good soldiers.

Khattaks.

The Khattaks have always proved themselves good honest soldiers, and should be freely enlisted in separate companies, in Punjabi regiments.

Mishwannies. Amb.

There is a tribe known (I think) by the name of "Mishwannies," who inhabit a small mountainous district east of Lawrencepore, and bordering on British Hazara, who have the reputation of being brave and hardy men, and from whom we could and should enlist two or three companies in one of our Punjab regiments. They would doubtless make excellent soldiers, and like other exclusive tribes they would enlist freely if commissions were given to some of the young men of the leading families.

The men of "Amb" have fought bravely with us and for us on many occasions, and doubtless a troop of cavalry and one or two companies of infantry could be raised from them in like manner.

Black Mountain.

Swát.

There is no reason why we should not now enlist one or two companies from one of the Black Mountain tribes, say the Chuggerzais, into one of our good regiments, for instance the 19th Punjab Infantry, and so gradually extend our influence over the others; but the men from Swát are not likely to make good soldiers.

Chitral.

Chitral and the adjacent countries will probably be indented on freely now for the Cashmir army, and they should be commanded by selected British officers.

Pathans & trans-Indus tribes, &c.

Having very little personal knowledge of the tribes beyond our border, I am unable to say much about them. Looking to the world-known fact that we shall have to fight sooner or later against a foreign power for the defence of our frontier, which frontier must and will include the whole of Afghanistan, we should lose no time in pushing our influence as much as possible throughout that country, and also amongst the numerous warlike tribes that lie between it and the Punjab; and our best way to do that will be by freely enlisting men from them into our regiments in a systematic way. The following suggestions cannot be worth much, but they may help to incite other officers who know the subject well to make others from which a regular scheme could be formed.

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* There is one work, however, which the Yusufzai or Khyber Pathan would do most effectually, and for which they are well suited, better suited in fact than better soldiers would be, and that is the subjugation, and complete tranquilisation of such tracts of country as the numerous Lushai, Chin, and Shan &c., tribes inhabit: they should on no account be formed into regular regiments, but should be employed as border police; and 2000 of them might be most advantageously employed on that duty.

a. To enlist one infantry regiment composed entirely of Ghilzais, one regiment of cavalry of mixed Afghans, one infantry regiment (Pioneers), and one company of Sappers, both of Hazara men, the latter for the Bombay army, which regiments might be at stationed at say Lundi-Kotal, Loralai, and Quetta respectively. They should be extra to the present strength of the army.

b. To complete the 26th Punjab Infantry and the 5th Punjab Infantry (Punjab Frontier Force) with Afridis, and to locate them permanently at, say, Cherat and Mooltan.

c. To enlist other tribes by companies; such as

Waziris........	2	companies	1st	Punjab Infantry.
Ditto	2	ditto	29th	ditto.
Ditto	1	ditto	Guides.	
Mohmands....	2	ditto	28th	Punjab Infantry.
Bonerwals.....	2	ditto		ditto.
Ditto	2	ditto	31st	ditto.
Bajauris.......	2	ditto	24th	ditto.
Ditto	2	ditto	4th	ditto.
Ditto	1	ditto	Guides.	

and so on with the 19th, 20th, and 21st regiments.

The 27th Punjab Infantry, which was always famous for its Dogras, might become a Dogra regiment.

The 22nd, 25th, and 30th might become the three new Sikh regiments.

The 16th and 18th Bengal Infantry might become Jats.

Corps of Guides.

The presence of Sikhs, Yusufzais, and Punjabis in the "Guides" does not seem to be any longer necessary, but Guides are required for other less known countries; therefore four companies of those classes might be transferred to other frontier corps and might be advantageously replaced from the Kafirs, Bajauris, Waziris, and other tribes, and the introduction of more Afghans into the Guide Cavalry would also appear to be desirable.

I would strongly advocate the immediate withdrawal of all Sikhs and Hindus from the regiments that enlist Pathans, excepting only the Gurkhas and Dogras of the Corps of Guides.

All the foregoing remarks are, I think, applicable also to the mountain batteries of the Frontier Force, and to all cavalry regiments.

Regiments that enlist Pathans largely by companies should be filled up by Muhammadans from the Punjab, and I would suggest that the uniform worn in the Bombay Biluch regiments be also worn in them, as I feel sure that it would attract those men more than the red coat does.

In course of time more and more men can, and surely will, be gradually brought in from the different tribes, which, however, should never be mixed up together but kept separate in companies; and so we might get to complete regiments from some of them.

All British officers should be required to pass colloquial examinations in the languages spoken by the men of their regiments.

Bombay.

None of my notes on the Bombay army being accessible, renders it impossible to give here any lengthened suggestions regarding it. It has some grand traditions and a great war history, which will surely be added to considerably on every occasiont hat it takes the field.

To the successors of Jacob, Merryweather, the Malcolms, and Phayre, should be deputed the honour of forming regiments from the Biluchis, and such other tribes as lie to the west and north-west of the Waziri country; also from the western Waziris. A sufficient number of capable officers will be easily found only too willing to do such a grand work; but they must be given a free hand, and must not be too much hampered by the well designed and well meant regulations contained in our numerous "red books." The work will then be well done, and the official screw and "red tape" entanglements can be gradually applied later on. Indeed the same remarks apply with equal force to all enlisting from independent tribes and countries: the men will then be slowly but surely disciplined and brought into order, in the same way as that magnificent regiment of Cureton's (now the 15th Bengal Cavalry) was.

But if the official fetters, necessary though they are, and ever will be, are applied too suddenly, or too tightly, the result must and will be a complete failure; and co-operation with our neighbours beyond the frontier against a common foe will become almost, if not quite, impossible. Indeed, if recruiting and commanding officers are not given that free hand which is absolutely necessary to ensure success, the experiment of enlisting trans-frontier men had much better not be attempted at all.

Hazaras.

I have already suggested the formation of a company of Hazara sappers and miners.

Sikhs.

There are many classes of Sikhs such as the Aroras, Lobanas, Kotab, Turkhans &c, who should never be mixed with the Jats, but who would make splendid soldiers if enlisted in separate regiments; and the formation of three such regiments would doubtless add greatly to the strength of the Bombay army.

Punjabis and Hindustanis.

The regulations regarding recruiting Punjabis and Hindustanis are strict enough, but they are constantly evaded. The famous 23rd Bombay Infantry was for many years enlisted from the Furuckabad and Meerut districts; and some others regularly have obtained recruits form Punjabi Muhammadans of the worst classes. There can be no objection to regiments continuing to enlist the men that they do now, but it should be officially recognised, and good men would then be obtained with the assistance of the civil authorities.

Mahrattas.

There can be no finer soldiers then the old Mahrattas, but good men of that class are hard to get now, which is chiefly due to the low rate of pay: a slight increase of pay would doubtless secure large numbers of good men from the Konkan and Deccan.

Africans.

There does not appear to be any reason why Arabs, Somalis, Sidis, and others should not be largely enlisted at Aden, Bombay, and other places, and formed into separate companies, or even regiments; they would then enlist readily, and would prove useful; but for a very long time there has been, and there still is, an almost unconquerable objection to anything like "class" formations in the Bombay army. Such a feeling was doubtless reasonable enough at first; but surely the reason, and the time for it, has long since passed away.

Biluchis.

The closing of the Punjab, except for Sikhs already mentioned, would doubtless prove injurious to those fine (so-called) Biluchi regiments, of which the very attractive uniform is so much admired, but it is probable that their fighting powers would be much increased if they were composed more entirely of the real Biluch element with the addition perhaps of two companies of western Waziris, Karkurs, or men from the Zhob country.

New regiments.

It is worthy of note that when in 1858, three new regiments were raised in the Bombay Presidency, they were composed of entire companies taken from other regiments, a plan which is invariably followed in the German army, and which seems worthy of imitation elsewhere whenever its applicability is possible.

Rohilkund.

That old warlike race the Rohillas are not sufficiently represented in our army; I would therefore advocate the raising of two complete regiments, one of cavalry and one of infantry, from them for Bombay. They should be localised.

Madras.

The re-organisation of the Madras army, so as to render it a thoroughly efficient fighting force, is a question that has puzzled many abler heads than mine; however, a way out of the difficulty must be found quickly, or it will be too late, and I must say, with all due respect, that the present way does not appear to be the very best one. The circumstances which led to the formation of the Burmah Military Police and the splendid work that has been performed by that force, are too well known to require repetition here; but it seems to be very doubtful whether the transformation of those battalions into regular regiments of the Madras army is judicious. I have frequently heard the following questions asked. Is that measure popular in Madras? Will it render the Madras army more efficient, and better able to take part in the defence of the empire? Will it tend towards the pacification of the Burmese frontier? Are there no other men competent to do that work just as well, or even better, than it will be done by men from the Punjab and Nipal. And will it not interfere very much with recruiting from those classes for the Bengal army?

Those and many other questions, which will naturally suggest themselves, are being constantly asked; but the replies are not so satisfactory as could be wished for. Not having any great personal knowledge of the Madras Presidency, though I have studied the military question rather carefully, the suggestions here are chiefly made from the views and opinions that I have been able to collect from others. The Madras cavalry are chiefly composed of Muhammadans, with some Rajputs and southern Mahrattas; let them keep to that, if the dress of the regiments is assimilated to that worn in the Bengal cavalry; and if they are all armed with lances, no further change seems desirable, unless a regiment of Muhammadan Gujars from Bengal is added.

The infantry is different.

The old Madras army did splendid service in Egypt, Java, and Burmah, at Assaye, and Seringapatam, and it remained loyal during the Mutiny; moreover those regiments that went to Afghanistan stood the climate, and did their work well. It was chiefly composed of Muhammadans and Telingas, recruited mostly in the Northern Circars and the Central Carnatic; but men of the requisite physique are not now procurable.

Tamils.

The famous Madras Sappers are composed chiefly of Tamils; but men of that race are far too well off to enlist readily; if, however, the pay of the sepoy was raised, there is every reason to believe that two efficient regiments could be raised and maintained from them.

Muhammadans.

The Muhammadans of Madras appear to be the only people, heretofore enlisted, who prefer soldiering to any other profession; and if they were formed into purely "class" regiments, there seems to be no doubt that they would do well, especially in Burmah.

Mapilas.

The Muhammadan Mapilahs of Malabar, who are a cross between the Arabs (male) and Nairs (female), have the reputation of being brave men of fine physique; and it seems almost incomprehensible why they have not supplied one or more regiments to the Madras army.

Nairs.

The same remarks apply to the Nairs of Travancore, who are Hindus. Surely officers could be found, who would be only too glad to have the honour of raising corps from those two classes.

Coorg.

The hill men of Coorg are very highly thought of, but they will not enlist into "mixed" regiments, small blame to them; nor do they like leaving their own country, but this feeling would soon wear off, if they were formed into local "class" regiments enlisted for general service.

There seems, therefore, to be a large quantity of good fighting material still in the Presidency, which would be available if properly worked, and properly paid. Much has been said for and against the Madras "family" system, which was perhaps carried to too great an extent; but there is no doubt whatever, that if we wish our mercenary troops to fight for us willingly, we must consider above all things the welfare and interests of their families. Why is it local corps have always proved so extremely loyal? A question which can be answered by the officers of the old southern Mahratta Horse, whose reward for steadfast loyalty under the most trying conditions was disbandment.

It is not proposed here that *all* regiments should be localised; or that all married men should have their families with them, but it is suggested that it would be highly advantageous in every way, if every sepoy knew for certain, that in the event of his being killed or disabled or dying from sickness etc. on service, his family would be well looked after; and also that during his absence from home either in peace time or on service, they would be under government protection, and would be sure of receiving all monies sent to them. Much is done in that direction, but not nearly enough.

Malays.

The Malayan Peninsula is without doubt a splendid recruiting ground, which is never made use of, but which could and should furnish two, if not three, good regiments for the Madras army, that would prove far more efficient for frontier work in Burmah than any other men that could be found throughout the empire. The old Ceylon Rifles was composed almost entirely of Malays, was always very highly spoken of, and attained to a wonderful state of efficiency. In those days it consisted of 2,000 rank and file, with 47 British officers, besides native officers and a few British non-commissioned officers; there were 4 battalions of British infantry quartered in the island then, and consequently it is easy to find officers who will speak in the highest terms of the efficiency and general excellence of the Rifles. I would venture to suggest the raising of three battalions of Malays, of which two would be in northern Burmah, and one in Madras.

Nagas.

What better men could be got for frontier work in Burmah than Nagas; in fact for general service under British leaders, I do not see why they should not prove most valuable; they appear to possess in a high degree the qualities necessary in a soldier; and if two battalions of them were localised on the frontier, they would prove far more valuable than Punjabis; and being available for general service, would be a most valuable addition to the Madras army.

Bhootias.

If more men are required for service on that frontier, it would be an easy matter to enlist a battalion in Bhootan from the people who fought against us so bravely in 1864-65. Personally I have no knowledge of them, but there are many officers, notably Sir W. Lockhart, K. C. B., who could testify to their value as soldiers. Localised at, say, Bhamo, or indeed anywhere on that frontier, they would probably enlist willingly, and be of very great use. Moreover, by enlisting men from the Naga and Bhootan countries we extend our influence in a direction where such an extension is much to be desired.

Gujars.

I cannot help thinking that a Muhammadan "Gujar," like a prophet of old, is not without value, save in his own country, and I would therefore venture to recommend the formation of at least two battalions of these fine men for general service in the Madras army, but to be localised in good stations. There is a prejudice against them in Bengal, which to me is incomprehensible; but they are brave, hardy men, devoid of bigotry, and it seems a pity that they should not be utilised as soldiers.

It may be urged that my suggestions, if carried out, would introduce too strong a Muhammadan element into Madras; but of two or more evils it is always well to choose the least. We want good men to form an efficient fighting army, and we have them in plenty if we will only utilise them.

Hyderabad, &c.,

I have not touched on the Hyderabad Contingent and other local Corps in Rajputana, as I know very little about them. They have always done excellent service when called on, and therefore it is presumed that their recruiting arrangements are satisfactory. I cannot help thinking, however, that all of them should have the same number of British officers that are considered necessary for other regiments, so as to enable them to be equally efficient if called out for service.

In dealing with the Indian army as a whole, and there is no doubt that no part of it can possibly be dealt with separately without affecting the whole, there appear to be certain dangers to be guarded against, and certain changes to be necessary, of which it might not be out of place that mention should be made here.

1*st.*—The greatest danger now-a-days appears to be the daily increasing progress in actual fighting efficiency of the native army as compared with that made by the British force in the country, which must and will continue, so long as the latter is recruited on the short service system and is being constantly changed: there is one and only one remedy for this, and that is the localisation of an increased long service force. No arguments appear necessary to support this statement, as it seems to be plainly apparent to all. There should be 80,000 able bodied men in the ranks of the British army.

2*nd.*—There should be no undue preponderance of any one class or religion in the army.

3*rd.*—There should be more British officers with native regiments, not only for leading in battle (this weak point is recognised by our foreign critics as being the "Achilles heel" of our Indian army,) but also to enable every regiment, or every set of three battalions, to detach one for recruiting duty, which latter is almost, in my humble opinion, of greater importance than the former.

4*th.*—Very careful selection of British officers for regiments of different classes. No officer should be appointed to any command in a native regiment, who has not a good knowledge of, and a complete sympathy with, the class of which it is composed. It does not appear to be either judicious or safe to take officers who have been accustomed to deal with men of one race, and to put them to command regiments composed of men belonging to a totally different race and religion; this has been often done, and the results have proved most unsatisfactory in many ways. British officers have their likes and their dislikes, the same as other men.

5*th.*—If the native army is to be efficient, the men must be contented. They should not be pampered, but they should be treated liberally, and I would therefore suggest the following changes :—

An increase of one rupee a month to every sepoy on joining.

A free outfit of everything that is considered necessary for a soldier to have on joining, to be given in place of the present allowance of Rupees 30, which in many regiments does not cover the cost of the outfit.

A new great coat to be given every seven years free of cost, to replace old ones that are worn out.

One pair of good Cawnpore boots to be given free every year.

All uniform that a soldier is required to wear in the performance of his duty to be given to him free, also all such articles as are absolutely necessary for keeping his accoutrements &c., in good order. A man would then never be in debt, except by his own carelessness, and one great cause, perhaps his greatest cause of discontent, and the greatest hindrance to recruiting, would be removed.

6*th.*—Abolish good conduct pay, and substitute long service pay, *i e.* adding to the pay of all below the commissioned ranks according to length of service in each grade.

7*th.*—Supply free transport on a fixed scale to every man who has to march or move on any duty, instead of giving marching batta.

8*th.*—Make all barracks and quarters that are occupied by soldiers the property of the state, and put them under the Public Works Department for care and maintenance.

9*th.*—Increase the ration of the sepoy when on service. Under the present rules, the service ration is less than what a man is supposed to eat in cantonments, and the deprivation is sorely felt by the men.

10*th*—When entirely new cavalry regiments are raised, it would appear advisable that the first supply of horses should be given free by government; it will entail a large outlay, but will probably prove the best way in the end, more especially when raising regiments from tribes or countries beyond our border ; all subsequent purchases would be made in the usual way.

11*th.*—In dealing with the reserve, I would venture to suggest that the reserve pay be entirely "deferred," that is to say, that every man on the reserve list under the age of 40, who joins his regiment for active service, whether he is called on to do so or not, should be paid down the lump sum that has accumulated to his credit up to date. Every man to be allowed to join his old regiment in the rank that he formerly held when discharged. The usual pay for training to be given as at present. In this way we should get more trans-frontier reservists than we can expect to do under the present system. A bonus to be paid to every such man who brings an efficient recruit with him—so much for each recruit.

It appears highly desirable that the government should take up large tracts of good hill country in two or more different places for Gurkha colonies. The necessity for this has been repeatedly recognised, but no definite action has yet been taken, and in the meantime we are losing many valuable men every year, who would willingly settle in such places, and whose sons and daughters would help considerably in filling our ranks with good loyal soldiers.

12*th.*—Lastly, all regiments should be composed of men belonging to one class, or religion, or caste, and in no case should men of two entirely different and opposite religions be mixed in the same regiment. We require more cohesive strength in our disjointed regiments composed of classes that are antagonistic to each other. The past five years has shown a marked improvement in that respect, which it is to be hoped will continue unchecked. An army composed entirely of "class" regiments will contain such an amount of "*esprit de corps*" as was never before seen anywhere. From want of papers, and books of reference, I am unable to treat this most important subject in as satisfactory and exhaustive a manner as it requires, but still I hope that my remarks may assist a little in solving the difficult problem of recruiting for the Indian army. More money, more method, and more energy are required : there are plenty of officers to be found who combine the two last with a sufficient knowledge of most of the tribes and classes from which recruits are wanted ; and government must find the money somehow ; many ways for doing which will quickly suggest themselves.

Avarice exceeds patriotism in the hearts of all Asiatics, and if we do not so work on that intensely human feeling to enlist the Afghans, Pathans, and others on our side, we shall find that our enemies will do so, and that tempted by promises of blood, rapine, plunder, and other delights, which we are unable to offer them, they will join his ranks in irresistible numbers. We lost the Turkomans owing to our apathy and supineness, and they are now arranged against us : let us therefore take heed that we do not also lose their co-religionists of Afghanistan and the intervening countries, and so lose India altogether.

We want men now of the same stamp as Jacob, Herbert Edwardes, Nicholson, Coke, and Brownlow, and we have such men in the army, but they will have to be extracted carefully from the struggling mass of officers, who from having been long smothered in "forms" and "returns," and half strangled by "red tape" and official routine, have had little chance of showing their qualities and talents, even if they are aware of them themselves. They will be found in all three Presidencies ; but men of that stamp are modest and retiring, and are not found blowing their own trumpets in public places. Let them then be diligently searched for at once, and when found let them be sent out and be given a free hand to solve in their own way the difficult and delicate questions of opening new recruiting grounds for our native army ; and so let us ever go forward.

THIRD ESSAY,

By Major E. G. Barrow, B. S. C.

> "Thanks to the kindly dark faces who fought with us faithful and few."
>
> TENNYSON.

The subject set by the United Service Institution of India, for this year's essay is one of the most vital questions affecting the military policy of the Government of India, for on its ultimate solution depends not only the efficiency of the Indian army, but the relations of the Government to the tribes and peoples bordering British India, as well as the social condition of many races within our frontier.

The terms in which the subject is stated would imply that the warlike spirit of the classes hitherto employed has been more or less deadened, and that we shall have henceforth to seek soldiers from other races. This view of the case would apparently restrict our enquiry to new sources of supply, or to races now employed only to a comparatively limited extent, a simple problem which would be disposed of by a study of the Pathan, Tajik, and Hazara tribes dwelling between the Indus and the Oxus. But from this narrow point of view we lose it seems to me the chief value which attaches to a discussion of this nature, and I therefore assume that what the Council really wishes to know is, what are the best sources from which to obtain recruits for our native army. This without doubt is the question really at issue, and not merely, what new races we can recruit from. Unless we take a broad comprehensive view of the whole subject it is impossible to arrive at definite conclusions, and a mere abstract study of possible sources of supply would not usefully advance our knowledge, or enable us to form a definite decision.

The fact is the question is complicated by what may be called the exigencies of the labour market, and by political expediency. We may be compelled to take an inferior article by our inability to pay for the superior, or again statesmanship may demand caution in employing too widely any particular class. For example, if we wanted the very best article only, and could afford the luxury, we might conceivably restrict ourselves to the British soldier, or if we were not hampered by political considerations, we might cease to recruit east of the Jumna. But we are unfortunately bound to keep all these considerations in view, and consequently the scope of this essay becomes very considerably extended.

In the first place, it is doubtful if we are fully justified in saying that the 'Pax Britannica' has wholly destroyed the warlike spirit of the peoples who have most profited by it, and though the ploughshare may offer to many greater attractions than the sword, it by no means proves that the former warlike spirit of the people has been deadened thereby, any more than we can assert that the industrial activity of England has destroyed the stubborn tenacity which distinguished the soldier who fought under Marlborough or Wellington. It is probably a simple question of supply and demand, and now-a-days we do not get the best material available simply because we do not pay the proper market value. If we chose to put down our money, we should possibly enlist just as good men as ever we got in the good days of old. In this connection I cannot do better than quote the remarks made by two of the most distinguished military officers in India at a meeting of the United Service Institution in August last.*

MAJOR-GENERAL SIR JAMES BROWNE said :—"I cannot say I entirely agree with the lecturer's opinion, that the difficulties we now meet in obtaining the proper class of recruits for the native army are due to a decline of martial spirit. It appears to me to be simply a question of money ; and that, whenever we are prepared to pay our native soldiers as good or better salaries than any able-bodied man can earn for himself by labouring on roads or railways, we shall get as many good soldiers as we require."

SIR GEORGE CHESNEY said :—"I do not think that it is at all a matter of certainty that the influences of civilisation have had the degenerating effect on the classes from which our best soldiers are drawn, that seems to be generally supposed. If recruiting had completely fallen off among any particular class, heretofore deemed warlike, the fair inference might perhaps be, that the class in question had changed in character. But if we find, or as in fact we do, that recruiting has not stopped, but has only fallen off in amount, the conclusion to be drawn appears different. If, for example, a class which formerly supplied (say) 50,000 soldiers now furnishes only 10,000, we have no reason to suppose that the 10,000 who come forward are different in character and feeling from those who stay behind, and the fair conclusion therefore seems to be, that it is not degeneracy but some other cause which keeps this majority away. And the cause is surely not far to seek. Although it is true that in many indirect ways the condition of the soldier has been improved of late years, yet the actual rate of pay has remained the same throughout the century, while the rate of wages in the labour market has doubled, probably trebled, within that time. Is it to be wondered then, that the people do not come forward with alacrity to encounter all the risks and restrictions of the soldier's life, when the sepoy's pay is less than the earnings of a common labourer? I hope that when we require to increase our forces, the offer of pay more in accord with rates ruling in the labour market will secure all the soldiers that we are likely to require."

Now the views expressed by these officers will naturally command much attention, for they are the matured views of officers who knew the old Bengal army, and who are therefore specially qualified to form an opinion. Moreover it seems to me these views are not mere expressions of opinion, but are logical deductions which rest on well understood physical laws. It is unreasonable to suppose that the spirit of a race is destroyed in less than a generation.

Discussion following Colonel Lance's lecture on recruiting for the native army. Journal of United Service Institution of India No. 83 of 1890.

Courage, energy, patience, resolution are the products of centuries of natural selection, just as much as are beauty, activity, and strength. We know that we cannot destroy the physical attributes of a race in one generation, so why should we suppose that the moral attributes can be so rapidly and thoroughly annihilated? It may be perfectly true that the causes of deterioration have now *commenced* to operate, but it is impossible to believe that these causes can produce any appreciable effect for several generations. The Greek, the Roman, the Spanish soldier are all examples of this law of nature. They deteriorated in each case owing to distinct natural causes, but in no one case was that deterioration visible to contemporary man. In each case it was the work of centuries. At all events it is contrary to common sense to suppose that the children of the Khalsa warriors who fought at Chillianwalla, or the grandchildren of the sepoys who fought under Lake, have lost all their moral characteristics, while their physical attributes remain to all seemingly totally unchanged. We may not now get the cream of Indian manhood, but that is entirely due to other causes, causes which money can control, and not to any appreciable reduction in warlike spirit. Impressed as I am by the truth of this axiom, I propose to investigate the subject of recruiting from a more general point of view than that apparently contemplated by the text, and shall include in this enquiry those races who it is so often assumed have lost their natural spirit.

In the first place, I must premise that this question of recruiting must be ruled to a very considerable extent by political and financial expediency, and that we are not at liberty to enlist only from those races whom we have reason to suppose are the most warlike. To do this would be to upset that theory of counterpoise which has so long and so wisely been upheld by the Government of India. Experience has shown us that a homogeneous army *is* a source of danger, and few will deny that the principle of dividing the interests of the native army and of employing in it as many races as possible is the correct one. Apart from this there is the financial consideration. If we were to have a homogeneous army recuited only from the Punjab and beyond the Indus, it follows that every station in India would have to be garrisoned by Punjabi or Afghan troops. Now the liability of having to serve at places so distant as Trichinopoly or Cachar, and in climates so unsuitable to the northern races, would either be prejudicial to recruiting, or would compel us as in Burma to give free rations or special rates of pay to troops so circumstanced. It is considerations such as these, that compel us to admit that we must to a certain extent rely on existing recruiting grounds, and that new fields can only be resorted to in a limited degree. Still the fact remains, that the best fighting men come as they always have done, from beyond the border, and moreover it is Afghanistan, in which term I include the border tribes, where economic causes have least tended to reduce the supply. Afghanistan in its widest sense includes Badakshan, the Upper Oxus provinces, and Turkistan, but these are countries, at present at all events, beyond the sphere of influence of the Indian Government, and where it would be hopeless to look for recruits except in very limited numbers. The same may be said of the Herat province, so that practically the only tribes from whom we might hope for recruits are:—

(1.)—The Hazaras.
(2.)—The Tajiks of the Kabul district.
(3.)—The Ghilzais.
(4.)--The Duranis.
(5.)—The Khagianis, Mohmands, and Shinwaris of the Jalalabad district.

As regards the first, much has been written and said, and the brave hardy Hazara has many admirers and supporters. Doubtless if we could get men of this race to enlist, they would prove useful and plucky soldiers and also a reliable counterpoise to the increasing Pathan element in our army, but unfortunately our service is scarcely attractive enough; the Hazara prefers to earn money as a labourer, It is, however, conceivable that we might enlist them as sappers, especially if we localized them on the frontier. As pioneers or sappers, if constantly employed in road making or railway construction, possibly they might earn sufficient to induce them to enlist.

The Tajik tribes could doubtless supply excellent soldiers, and soldiers whose antagonism to the Pathan races would be an important political factor, but here again it is questionable whether our service offers sufficient inducements.

In any case the man would have to serve far from his home, the nearest military station under present conditions being Peshawur. Moreover it is quite possible, that if recruiting from the class became too brisk, our very loyal ally the Amir might raise indirect difficulties which would not tend to the advantage of his Tajik subjects. Still this is a class which it is worth making an effort to enlist, and if the present rates of pay are insufficient, I do not see why the government should not bid higher, on the same principle that it pays more for its soldiers when they enlist to serve in a foreign country, such as Burma is to the Punjabi or Madrasi. If we want the Tajik to garrison our Punjab stations, why should we not recognise that the Punjab is to him a foreign country and that we are justified in paying him accordingly?

Of course these remarks apply equally to the Hazara, the Durani, and perhaps the Ghilzai. The great Ghilzai tribe has on a hundred occasions proved its aptitude for war, and no bolder or more hardy race is to be found in Asia, but on the other hand the Ghilzai is "the son of a thief", with whom treachery is second nature. We may admire him as a soldier, but we should be cautious as to the degree of confidence we place in him as a servant, and for this reason we should be chary regarding enlistment, that is to say, we should never enlist so large a number that this element could by any possibility become a danger to us, even if they distinctly threw off their allegiance to "the Sirkar." For this reason it would scarcely be advisable under present conditions to entertain more than two or three thousand men of this class. Whether we could get even this number is, however, doubtful, unless we raise the wage of the soldier. If we do decide on enlisting Ghilzais, permanent recruiting depôts should be established near the Ghilzai country; perhaps some point in lower Zhob would be the most suitable.

The Durani may be described broadly as the Afghan of the Candahar province. Physically he is a grand type of manhood, and the traditions of his race mark him as a born soldier, but somehow he betrays little anxiety for the profession of arms even in his own country, and it is doubtful whether we could obtain any but a small number of men of this class. It might, however, be practicable to raise a cavalry regiment of Durani Afghans, especially if the regiment were localized in Peshin, but this is a point which could only be decided by experience.

The Jalalabad tribes are generally speaking closely allied in type and nature to the tribes on the Peshawur border, and most officers would be at a loss to distinguish between the Shinwari and the Afridi. Hitherto but few men of these tribes (i. e. the Jalalabad tribes) have enlisted in our army, but possibly if we formed a recruiting depôt at Lundi Kotal, it might be feasible to raise a special regiment consisting of companies of Khagianis, Mohmands, and Shinwaris, more especially of the latter.

It will be convenient if I here sum up my conclusions as regards purely Afghan recruiting grounds. (1). The Hazaras and Tajiks, if sufficiently paid, may give us a few battalions of infantry, and it would be decidedly worth our while to try and raise such regiments, the Hazaras preferably, in sapper or pioneer corps.

(2.) The Ghilzais should be sparingly enlisted, and such as are should be kept distinct from the rest of the army in special class regiments.

(3.) The Duranis do not offer a very promising field, but it might be possible to raise a cavalry regiment of this class.

(4.) The Jalalabad tribes could I think certainly give us one battalion of infantry. I may here remark, that it would be most impolitic to give these tribesmen, as perhaps also the Ghilzais, any special increased rates of pay, unless it were intended to raise the pay of the whole army. Otherwise we should infallibly create grave discontent among the ranks of our other Pathan sepoys.

We now come to the so-called border tribes commencing with the Hazara districts. We have on the extreme north the Chilasis—a Dard race—to whom the term 'warlike' can hardly be applied, and who certainly present no characteristics giving them any special claim to consideration. Below these come the Hassanzais and Akazais of the Black Mountain, tribes furnishing but few soldiers and offering but a poor recruiting field for the future.

The remaining tribes, or sections of tribes, on the Hazara border are of no account.

The Peshawur district marches on its northern side with the lands of the Gaduns, Khudu Khel, Bunerwals, Swatis, Utman Khel, Mohmands &c., &c.

Of these the Gaduns and Khudu Khel are unimportant, mustering all told but a few thousand men. The Swatis are generally speaking a vicious, contemptible race, quite unfit for the profession of arms; while the Utman Khel, a tribe of Swati origin, have never shown any inclination for our service. There remain only the Bunerwals and Mohmands, who are really important, and who from their numbers, their aptitude for war, and their traditions, offer a suitable field for military exploitation. The warlike tribe of Bunerwals were our most formidable opponents during the Ambela campaign of 1863. They are said to muster nearly 40,000 fighting men, and are as gallant and hardy a race as any to be found along our border It is much to be regretted that so few of the Bunerwals have hitherto been enlisted, and considering their martial instincts this is somewhat surprising. I can only attribute it to love of home and dislike of subordination to men of other tribes or races. It would, however, be greatly to our advantage, if we could induce this tribe to enlist freely, and it is possible this end might be attained by establishing a militia regiment on the northern border of Yusufzai in which only Bunerwals, Chamlawals, Khudu Khel, and Gaduns should be allowed to enlist. Such a regiment should have a permanent cadre of about 100 men to form a nucleus, and also to act as a training depôt for native officers and non-commissioned officers. The militia might be embodied annually for three months during the winter. The staff of British officers might be limited to a commanding officer and adjutant. The inducement of three months pay and lodging during the inhospitable winter season of Buner might prove attractive, especially as the period of training would be passed in the society of their own clansmen, while in time of war if necessary this militia organisation could easily be developed into a regular regiment of the line. It may not be out of place to remark, that in such a tribal militia it would be advisable to adopt a class company organization, by which each section might be kept distinct. Thus the Salarzais would all be in one company, the Gadazais in another, &c., &c.

The same system might be applied to the Mohmands. The Mohmands, as most of us know, inhabit the hill country between the Kabul and Swat rivers, and also parts of the eastern end of the Jalalabad district. They probably muster nearly 20,000 fighting men, and with a permanent depôt at Fort Michni, there is no reason why this tribe should not enlist freely in a militia regiment of their own clan.

Omitting the insignificant sept of the Mulagoris on the slopes of Tatara, we now come to the great Afridi clan whose territories border our own from the Khaibar to the Kohat pass. This great clan, as is well known, furnishes more recruits to our army than the rest of the trans-frontier tribes put together; nevertheless it is thought that still more might be enlisted if we exerted ourselves to that end. The most numerous section of the Afridis is the Adam Khel, that dwelling in the mountainous tongue of land which separates the Peshawur valley from the Kohat district. This section musters nearly 5.000 fighting men, yet it gives comparatively few recruits to the army. Possibly the formation of a few special Adam Khel companies in Punjab or Frontier regiments might attract more men of this particular section, and the experiment would seem to be one well worth trying. Next to the Afridis come the Orakzais, a numerous tribe bordering the Kohat district from the Adam Khel country to the Zaimukht hills The tribe musters most certainly over 20,000 fighting men, yet it gives but few soldiers to our army.

There is absolutely no reason why the Orakzai should not enlist just as freely as the Afridi, and I can only suppose he does not do so because a beginning has never been made. I cannot but think, that if we started purely Orakzai companies in some of our regiments, just as we now have Afridi companies, the experiment would meet with a favourable result. If it failed, we should as in the case of the Burnerwals have to resort to the preliminary expedient of raising a militia regiment for service in Miranzai.

Contiguous to the Orakzais in the western border of the Kohat district lies the Zaimukht tribe. The Zaimukhts in the opinion of many officers would make excellent soldiers, and their physique is admirable. They number between 4,000 and 5,000 fighting men, and we ought at least to be able to raise a few companies among them: failing this they might be affiliated to the suggested Orakzai militia.

The Turis of the Kuram valley from all accounts are not worth enlisting, and for suitable material we must go across the Kuram river to the lands of the great Wâziri tribe. This tribe may practically be treated under two separate heads. On the north we have the Darwesh Khel Waziris, on the south the Mahsud Waziris. Of the former Colonel Lance in his lecture said:—"They are hardy and brave men, and if organized and disciplined would make valuable soldiers," while the latter he very truly remarks, "are daily being brought more under our influence and might ere long, if not now, furnish a valuable contingent to the Punjab army." This opinion is fully supported by our experiences in the first Waziri expedition, and the only question seems to be, how can we attract this valuable material to our ranks? I doubt if in the first instance it is any use trying to raise Waziri companies. The inclination to take regular military service does not at present exist, and I would therefore advocate the extension of the militia system to this tribe, half of the force thus raised being recruited from each of the two great divisions.

Below the Waziris we have no Pathan tribes of importance, but the Bitanis, Shiranis, and Usteranis might possibly give a few recruits, if special efforts were made to obtain them.

In the above review of the Pathan border tribes, I have limited myself to those actually dwelling along our frontier, as they are the tribes whom it is politically most important to attract to our service, but I have no doubt whatever, that we could get equally good men if necessary from Bajaur by raising special companies; and such companies might with advantage be attached to the Corps of Guides, in place of the Gurkhas now enlisted by that distinguished regiment.

Apart from the Dard and Pathan races lying between us and the Hindu Kush, is that isolated group of savage tribes inhabiting the Alpine region known as Kafiristan. For many years great hopes existed that Kafiristan would eventually prove a grand recruiting field, but the experiences of the Lockhart Mission seem entirely opposed to this sanguine expectation, and it is probable that the Kafirs generally speaking will continue to be ill-adapted for military service, until contact with more civilized races has raised them out of their present condition of absolute savagery, a condition which little accords with the necessities of military discipline. In the distant future perhaps we may find in the Kafirs a valuable and trustworthy addition to our forces, but their present isolation as well as their savagery forbids the entertainment of any hope of now adding so desirable an element to the native army.

I now come to the Biluchis and Brahuis, that is to say, to the races inhabiting the countries lying between the Dera Ghazi Khan district and Peshin, and southwards in the region known to us as Biluchistan. Of these races much has been written and said both for and against, but I think I am fairly expressing the general opinion when I say that we cannot at present at all events expect very great results from any efforts we may now make to attract these races. The Biluch, as well as the Brahui, is desperately lazy and intensely conservative, and his deeply ingrained prejudices can only be eradicated by patient and careful treatment. I am inclined to think that the most suitable method would in their case be to raise a local militia on the clan basis, which should gradually be more and more developed, until we had in fact the substance of a regular force. With this object in view, it would it is thought be desirable to commence at once by forming corps of both cavalry and infantry on very favorable and attractive terms, for there can be little doubt that a Biluch element would be a distinctly valuable addition to our army. On this subject Colonel Lance says:—"The Biluchis are extremely hardy, and of very fair physique; they are free from fanaticism, and the records of many hard fought fights amongst themselves entitle them to claim credit for bravery, as reliable at least as that of many of the tribes in the Punjab, who are considered worthy to fill the ranks of our native army. For many years the Biluchis have been glad to serve in our border militia, and to accept other miscellaneous employment, but they have, only in rare instances, accepted service in our regular army."

With the Biluch this review of the trans-border races may be said to be completed, and we may now turn our attention to some of the Pathan tribes living within the red line. Those dwelling in the Hazara district are mostly of the inferior Swati breed, and on the whole Hazara is but a poor recruiting ground. Still there are many good men to be found in the district, men who both in physique and spirit leave nothing to be desired, and our recruiting parties, especially if led by British officers, might do worse than visit Hazara. In Peshawur at present we recruit chiefly among the Yusufzais and Khataks, in Kohat among the Khataks; and possibly these districts are now exploited to their fullest extent, as the Khalils of Peshawur and the Bangashis of the Kohat district have not many admirers, and are certainly inferior to the two great clans above mentioned: nevertheless, I cannot but think that if we wished to draw more soldiers from these two districts, we might do so by forming Pathan regiments locally recruited. For example, a Peshawur regiment might be raised, in which only Pathans from that district should be enlisted, and which should be composed of so many companies from each of the clans inhabiting this district. Such a regiment might consist of three companies of Yusufzais, two companies of Khataks, one Hashstnagar company, one Khalil, and one Mohmand. The same principle might be applied to the Kohat district, and thus I believe we might justifiably hope to raise at least two additional Pathan battalions. Again in the Bannu district, it is reasonable to suppose that a determined effort would result in our tapping fresh sources of supply. With reference to this district Colonel Lance says:—"In the Bannu district the inhabitants of Marwat, that is the country lying roughly speaking between the Gambela and the low hills that connect Sheikh Budin with the Suleiman range, would make fine soldiers, if the hitherto unconquered objection that they have shown to take military service could be overcome by the offer to head-men of appointments in the commissioned and non-commissioned grades. The Isakhel Pathans who inhabit the country below Kalabagh are fine men, who have already taken service to a a limited extent in the cavalry; some of the relatives of the chiefs are fine young men, who could bring soldiers of good physique, many of whom are excellent horsemen. Of the Bannuchi himself, I will not say much. He was branded by Sir Herbert Edwardes with the accusation of practising every crime in the decalogue, in addition to some not there enumerated; but he was nevertheless always able to hold his rich lands against the Waziri who coveted them, and even he might be worth a trial. Various sections of the great Durweshkhel Waziri tribe reside permanently within our border between Janikhel and Latummar, while others, like the Hattikhel, visit our territories for certain periods of each year. They are hardy and brave men, and if organized and disciplined would make valuable soldiers."

Similar remarks might be applied to Dera Ismail Khan where we have the Gundapores.

Mr. Ogilvie of the Punjab Commission fully corroborated Colonel Lance, remarking in this connection:—"The Marwats of Bannu, and Gundapores of Dera Ismail Khan, are tribes which ought readily to accept military service. Then there are the Pathan trans-border tribes, over whom our influence has quite lately been extended. The most notable of these are the Shiranis, and my belief is, that if a fair beginning can once be made, this tribe together with other tribes living in the Zhob valley and its neighbourhood, will become a promising field for the recruitment of the native army."

The fact is I believe, that these districts contain just as good men as Peshawur or Kohat, but that we have never made any resolute effort to enlist soldiers from among the inhabitants. We began with the Yusufzais, Khataks, and Afridis, and, as a general rule, we have been content to recruit from these tribes only, for it has given us no trouble to do so. The supply was equal to the demand, and there was really no pressing reason why we should exert ourselves to get Pathan recruits from other sources. I venture to say that at least 90 per cent. of our Pathan soldiers, at all events in the infantry, come from these three clans, and it is incredible to suppose that the small remaining balance is all that is available in the way of fighting material from the hundreds of thousands who represent the other Pathan tribes of our border districts. It would doubtless be now most difficult to raise recruits from amongst them according to our present methods. An Afridi recruiting party amongst the Mohmands, or a Khatak havildar in the Marwat country are not likely to meet with much success, any more than a Welsh recruiting serjeant would in Caithness or Aberdeen; and if we want to raise soldiers from these tribes who have hitherto held aloof, we must make a fresh start.

Three courses appear open to us. They are either :—

(1.)—To raise new tribal companies in existing regiments.

(2.)—To raise new regiments recruited from a particular area, or from amongst certain special clans.

(3.)—To raise local militia, which may be afterwards developed if necessary into regular regiments of the line Each of these three courses may be preferable in one case or another. The first for example could best be applied to the Adam Khel Afridis; while it might be quite unsuitable to the case of a tribe like the Bunerwals, one which is excessively clannish, much attached to its own hills, and but little inclined to military service under present conditions.

The subject of this essay is not primarily one of organization, and I do not therefore propose to pursue this topic further; but I may here reiterate the conclusions which I have formed regarding the enlistment of the Pathans and Biluchis within our own sphere of influence. They are :—

1st.—That there are innumerable good men to be got from clans which do not now enlist to any appreciable extent.

2nd.—That we have hitherto made no serious attempt to enlist them, and the efforts we have made have been ill-directed.

3rd.—That if we now want to enlist them, we must adopt more suitable methods.

4th.—That these new methods involve questions of organization and policy, such as the raising of new regiments, or the creation of a frontier militia, with a view to developing soldierly tastes among the tribes in question.

We may now turn to the cis-Indus districts of the Punjab. As regards this region the assumption seems to be, that the splendid recruiting ground once offered by the Punjab is now becoming worked out; that is to say, that we need not count on the Punjab for supplying any appreciable increase to our native army. This no doubt is to a considerable extent true, and the best authorities on this subject seem agreed that the Sikh element at all events admits of no further expansion, but nevertheless this requires some qualification. The fact is, the Sikh community is now-a-days so prosperous a one, that on existing terms the Sikhs do not as a rule find it worth their while to enlist. Moreover we have through the Burma Police and local battalions drawn very heavily on the Sikh element, but if we raised the pay of the army and closed the door to recruiters from Burma, as we have done to recruiters from Bombay, I have little doubt that recruiting for the army among Sikhs would again become brisk. The former remedy is perhaps not practicable, but the latter is. It is a waste of good material to send Sikhs and Punjabis in large numbers to Burma now that all serious military operations are at an end, and it is quite certain from past experience, that Hindustanis are sufficiently good for coping with any enemy Burma may offer. We may not be able to add largely to the Sikh element in the army, but I believe we can keep up the present supply, and that without lowering the standard now obtainable.

As regards the Punjabi Mussulman there seem to be serious misconceptions. It is generally supposed that he is a very inferior soldier to the Sikhs, and that he has no very strong inclination to enlist. Of course, if we take the scum of the Lahore and Pindi bazars we shall get a very inferior article, but the class as a whole should not be judged by the unfavourable specimens thus obtained. The Punjabi cultivators in the best recruiting districts, such as the Salt Range, are not one whit inferior to their Sikh comrades. They spring from the same stock, and have been born and bred under the same climatic conditions. Then as regards numbers; at present we limit ourselves almost exclusively to the northern districts, namely Pindi, Jhelum, Shahpur, Gujerat, Sialkot, and Lahore, but there are equally good men to be got in the Thal and the Bar, more especially among the Biluchis of the Sindh-Sagar Doab and the Sials of Jhang. Moreover the Punjabi is as a rule a poorer man than the Sikh, and therefore the more tempted to enlist. We are now engaged in raising a Punjabi-Mussulman regiment. If the experiment proves successful, there is no reason why it should not be extended if necessary.

The third class of soldier which the Punjab supplies is the Dogra. We are now forming a second regiment of Dogras, and there are besides a considerable number of Dogras in various regiments. Considering too the way in which the Dogra districts are drained for soldiers by the Cashmir authorities, it seems extremely doubtful whether more soldiers of this class could be obtained even if altogether desirable. In any case a great increase could only be at the expense of quality.

The conclusions I have thus formed regarding the cis-Indus Punjab are :--

(1.)—That recruiting for Burma should be stopped.

(2.)—That if this be done the supply of Sikhs can be kept up, even if it cannot be augmented.

(3.)—That it is hopeless to look to the Dogras for any increase in numbers.

(4.)—That of Punjabi Mussulmans there are numbers of good men available, especially if we try and tap new districts.

Let us now investigate the case of the Gurkhas, than whom no finer soldiers are to be found in the east. The Gurkhas in our army are mostly Magars and Gurungs, and as there are also several regiments of these classes in the Nipal army, it is obvious that a very large proportion of these by no means numerous tribes must already enlist, in fact it is by no means certain that we shall always be able to keep up the necessary supply.

But besides these aboriginal tribes, as also the Limbus, of whom a fair number now enlist I believe in the Assam regiments, there are two numerous and important classes in Nipal, who make excellent soldiers, and whom we now enlist only in a minor degree, namely the Khas, and and the Newars or Nagarkotis, as they are sometimes called. The Khas are the dominant race in Nipal. They are a mixed race, broadly speaking the descendants of the Rajput conquerors of Nipal by hill women. In Nipal soldiers of this class are held in the highest esteem, naturally so as they belong to the ruling caste, and by far the greater proportion of the Nipalese army is recruited from them. They are as a rule taller, slighter, and less Mongolian looking than the Magars and Gurungs, but with a less muscular physique they combine greater intelligence and more military pride. It is I believe quite possible, that from this class we might obtain more recruits than we now do, and though there is a strong prejudice in favour of the Magars and Gurungs, it is quite reasonable to suppose we should lose nothing by substituting the Khas for those hardy aboriginal tribesmen, whenever we find the class of recruits obtainable is from any cause inferior to the normal standard.

As regards the Newars the case is somewhat different. The Newars are an aboriginal hill race of Mongolian origin, who originally possessed the whole of the valley of Nipal, that is to say the valley in which Khatmandur is situated. About a century or so ago they were conquered by Prithi Narain, and by him and his successors reduced to a state of abject serfdom. The result is, that the Newars from a free people ruled by their own kings have sunk to be artisans, hewers of wood, and drawers of water. In fact they are now the working bees in that populous hive of men, the Nipal valley, just such a class as would furnish us with excellent pioneers. There may be no immediate demand for soldiers of this description, but when an increase to the army does come it will be as well to keep this class in mind. The accepted principles of mobilization demand a pioneer battalion for each infantry division, and this with our present number of pioneer regiments is a demand which it might be difficult to meet in case of sudden emergency. A pioneer regiment for what is known as the Hindustan area is very desirable, and I know of no class that would meet this want so well as the Newars. Again it would be advantageous to substitute a Newar pioneer battalion for the Hindustani regiment now quartered in the Assam command, not only because Assam is unpopular with, and unsuited to, the Hindustani soldier, but also because the number of Hindustani battalions is now insufficient for garrisoning the extensive region which those regiments are supposed to occupy.

The great recruiting ground of India has in the past always been Hindustan, that is to say, the country between Meerut and Dinapore, and it is generally with reference to this region that we speak of the decadence of the military spirit. It is said that half a century of peace has destroyed the martial proclivities of the people. This is possibly true, as the military career does not now-a-days offer the same advantages as formerly, and consequently fewer are attracted to the profession of arms, but this, as has already been said, is a totally different thing to a diminution of warlike spirit in those who do enlist. The Hindustani soldier may not now-a-days be so easily procurable, but when we do get him, he is just as good a man as ever he was. The character he bears is certainly not so high, but for this there are certain sufficient reasons. In the first place, ever since the Mutiny we have exercised no discrimination in the matter of recruiting, and have under the appellation of Hindustanis recruited a number of inferior castes, who from breeding, tradition, and aptitude were quite unfitted for the profession of arms. I need only mention the Kurmis and Pasis, whom at one time we enlisted largely in some of our regiments. Again, the native officers and non-commissioned officers in the older regiments were as a rule somewhat inferior, owing to the force of tradition, which in those regiments especially clung to the old principle of promotion by seniority. Finally, by what may be called a process of natural selection, the best officers as a rule drifted into the cavalry or into Gurkha and other favorite and favored corps. These causes are I think sufficient to account for much of the deterioration that has taken place, but which for political reasons it is desirable to arrest.

The fact is, that owing to the great reduction in the demand for Hindustani soldiers, the quality of those now obtainable has distinctly improved, and as long as we confine ourselves to the best castes, there is every reason to hope that we shall be able to maintain in the highest efficiency the few Hindustani corps now on the rolls of the army, and more than this, it will be quite possible to replace the Punjabi element in Burma by Hindustanis, thus improving the market in so far as the regular army is concerned.

We should, however, strictly adhere to the principle of recruiting only from the best classes, namely the Rajputs or Chattris, Jats, Brahmins, and Mussulmans. To recruit from inferior classes is as unpractical as it would be in a dog-fancier to attempt to breed a fighting dog from a pariah.

As regards the Rajputs and Brahmins, there is no doubt the constant division of property that is going on tends more and more among those castes to compel the younger sons of a family to seek other means of livelihood than the land presents, and this together with the reduction in the numbers of Hindustanis required for the army, will inevitably tend hereafter to improve the supply, and one may consequently conclude that it would be distinctly unwise to neglect altogether this source of supply.

The Jats are a tribe whose origin is traceable to the same sources as the Jat Sikhs and Mussulman Jats, who have won so high and so well merited a reputation in the modern Indian army, and with the bright example of the 14th Jat horse there is every reason to suppose that in class regiments at all events Jat infantry would be equally admirable. Apart from the Jats of Hindustan there are excellent Jats obtainable in western Rajputana; of these Sir James Browne says:—

" If we are in search of new material for native soldiers, I think the Bikanir desert below Ferozepoor would give us excellent soldiers of splendid physique; and who are held in very wholesome awe by the Afghan Powindahs, who in their turn lord it over other races in Hindustan. The Jats of Bikanir and Jeysulmir are a very hardy and powerful race, and I do not doubt that we could raise a few battalions of them who would give a good account of themselves."

With respect to the Mussulmans it must be admitted, that we have now in our ranks some very inferior soldiers, but this is solely because we have grossly neglected the most obvious rules of selection. The scum of great cities, Hulwais, weavers, butchers, and thieves, have been enlisted indiscriminately under the saving appellation of Mussulmans. These men as a rule are the descendants of the lowest Hindu castes, and should no more be admitted into the army than the Chumars or Gwallas we at length have had the good sense to exclude. If we restrict ourselves to the true Mussulmans, the descendants of the men who won India; if we seek for recruits mainly among Mussulman villagers, and especially if we apply to this class the principle of class regiments, we shall find that we have in the Hindustani Mussulman an excellent soldier, who will usefully fill an honorable place in the ranks of the native army.

For Burma, for Bengal, for Hindustan, it is still imperative that we should raise and maintain Hindustani troops, and with common care, suitable precautions, and reasonable measures, we may rely on getting an ample supply of excellent fighting material from this the most populous and reliable recruiting ground that India offers to us.

So far only those races have been dealt with, who find or might find a place in the Bengal army, but this survey would be incomplete if we did not take into consideration the armies of southern India. These armies have for some years, and more especially of late, been somewhat discredited in public opinion, and it is commonly assumed, that the old fighting races of the Deccan and the Carnatic have so seriously deteriorated in spirit, that good soldiers can no longer be obtained from them. This assumption it may be hoped is as inaccurate as it is hasty.

It is not that the fighting races have seriously deteriorated, but that all sorts and conditions of men have been admitted into those armies, men of unwarlike races and castes, men of indifferent character and poor physique; while, in Madras especially, the vicious family system has utterly precluded anything like selection from the pick of the agricultural classes. The laxity, one might fairly say the viciousness, of the recruiting system, as also the obsolete and illogical organization of mixed regiments, has had far more to do with the deterioration of the southern armies than the supposed decline in the military virtues. It is because we enlist unwarlike Telingas, half starved line boys, and mongrels of low caste, that the reputation of these armies has suffered, and not because the country-bred Mahratta or Tamil is one whit less brave than were his progenitors.

With these remarks I may fitly preface the little I have to say regarding recruiting for the Madras and Bombay armies. In the Bombay army we have at present a large proportion of Punjabis and Hindustanis. The introduction of these classes, besides being opposed to the great principle of segregation, acts prejudicially on recruiting within the Bombay area, as it is the preference shown in the matter of promotion to these classes which renders service in the Bombay army less popular than it used to be with the indigenous material.

But this is only one cause. Service in Aden, Sindh, Biluchistan is another; and finally there is the greater difference in the wage of the soldier as compared with the market price of labour. The last is a difficulty which can only be surmounted by a general rise in pay, and is therefore beyond the scope of this essay, but the first is an evil easily remedied. Government has certainly placed a limit on recruiting from northern India, but this is not sufficient, it should be absolutely prohibited.

If Bombay cannot without such recruits keep up its strength, the obvious course is to reduce the strength of the Bombay army, for if it cannot supply sufficient recruits of good quality, there is every argument for reducing its strength and raising an equivalent elsewhere. It may be said, that with a reduced army Bombay would be unequal to performing all the duties required of it, but there is no reason why those duties should not be circumscribed. Why for example should not Biluchistan be garrisoned entirely by Biluchis, Brahnis, Duranis, and Ghilzais? Why should not Aden be furnished with a garrison of Soudanis or Zanzibaris? And if necessary both Sindh and Rajputana might be transferred from the Bombay army. This reduction would also cure the second evil noticed above, as the Bombay soldier would thus serve less and less out of his own country. Given the above conditions, it is more than possible that we might not only get more Mahratta recruits, but also men of better quality, and the same may be said of the Mussulmans of the Deccan, while a stimulus to recruiting amongst both these classes might certainly be given by the formation of class regiments.

The Konkani, on the other hand, seems to be a most indifferent fighting man, and the sooner he and the low caste soldier disappear from the ranks of the Bombay army, the better.

The enlistment of Africans generally is to be deprecated. They would undoubtedly prove far more expensive than natives of India, and it is by no means certain that they are better fighters. Moreover, their dislike to separation from their families would render it absolutely necessary to recognize their family system, and thus indirectly initiate the introduction of African colonies into India. There are, however, certain cases in which the enlistment of Africans, more especially Soudanis, Somalis, and Zanzibaris, would be distinctly advantageous. Aden for instance is not India, and probably African troops in Aden would not prove much more expensive than are Indian troops.

Again the Sindh stations are in climate and surroundings less congenial to the Dekkani than to the African of the east coast. There has also for some time been talk of raising native artillery, or at least of converting the Bombay Marine Battalion into an artillery corps. For troops of this description the African on account of his physique would certainly be more suitable than the slightly built Bombay sepoy. On the whole, it seems probable that some four or five battalions of Africans might with advantage be substituted for existing regiments of the Bombay army. This measure would also facilitate the elimination of low caste men and of soldiers from northern India. Briefly I may summarize the views here expressed as follows:—

(1).—The absolute prohibition of recruiting from northern India for the Bombay army.

(2).—The elimination of all low castes.

(3).—The adoption of the class regiment, with a view to stimulating the recruiting of Mahrattas, Rajputs, Mussulmans &c.

(4).—The entertainment of Soudanis, Somalis, and Zanzibaris for special local corps in Aden and Sindh, as also for marine artillery.

Before leaving this part of the subject, I should like to remind my readers, especially those who assume that the warlike spirit of Indian races is decaying, that nothing could exceed the good conduct of the 28th Bombay Infantry at McNeill's Zariba. This corps had, I understand, the advantage of being largely composed of Mahrattas, and it is to be hoped, that with an increase in the Mahratta element and its concentration in class regiments, we may hereafter be gratified by other similar conspicuous examples of military discipline and devotion. At all events, until the experiment of eliminating the bad elements in the Bombay army has been tried, we need not despair of that army regaining its ancient prestige.

The subject of the Madras army is a more difficult one, because it is impossible to avoid trespassing on delicate ground. It is undeniable that the reputation of the Madras army has suffered greviously of late years. Nevertheless more than one notable feat of arms has been performed by Madras sepoys, and the Madras cavalry at all events, not to mention the ever reliable Sappers and Miners, have shown that the Madras army still has on its rolls troops who can fight on occasion.

The Madras army broadly speaking is recruited from among three classes; the Telingas of the northern Circars, Mussulmans of Southern India, and Tamils from the extreme south of the Peninsula.

It is the first of these races which by general consent has failed the most conspicuously, and unfortunately it is also the most prolific source of supply. Under these circumstances the proper course would seem to be to reduce this element in the Madras army to the lowest limit, while at the same time the standard of physique in the other races should be somewhat raised. The result of these measures will assuredly be a great reduction in the available supply of recruits, and it is doubtful whether Madras will be able to keep up at full strength even the twenty battalions that are required for the garrison of southern India, without taking account of the requirements of Burma. The obvious conclusion is, that we must look elsewhere for recruits to supply the deficiency. The only races in southern India besides those already enumerated, who are credited with warlike qualities, are the Coorgs and the Mapilahs. The former are a race of mountaineers inhabiting the hill district of Coorg between Mysore and Malabar. They are I believe of Aryan origin, and in physique and feature are incontestably superior to the Dravidian races which surround them, while in their campaigns against the Mysoreans and ourselves, they gave ample proof of the valiant spirit which animates them. Their loyalty to the British *raj* is beyond suspicion, and probably in all India there is no race which we could employ with greater confidence and advantage. It will naturally be asked, if this be so, how is it that we have not hitherto enlisted the Coorgs? The reply that immediately suggests itself is, that the Coorg is averse to leaving his home in the hills. This is doubtless true, but possibly we have also ourselves to thank. When we conquered Coorg, the Madras army had no need of fresh recruiting fields, and moreover there would be a natural disinclination to employ a race but lately subjugated after the most desperate resistance. Since then the Madras army has been gradually reduced, while at the same time it has become more and more a close guild, jealously confining recruiting to the families of its own members. Consequently no real effort has ever been made to enlist Coorgs, and not one of that gallant race is I believe now in the army. It is of course more than likely no Coorg could now be induced to join one of our regiments as at present constituted, and further the number of the adult male Coorgs is after all very limited, probably not much more than five or six thousand; but with their martial traditions and intense pride of clan, it is possible that service in a local class regiment would be readily accepted by them, especially if such service assumed a militia organization.

It may be said that a garrison for Coorg is unnecessary. This is quite true, but such a regiment should be looked on, not as a garrison for Coorg, but as a reserve for war and a check on the somewhat turbulent and fanatic population of the Malabar coast. A regiment of Coorgs at Mercara would be much more effective for this purpose than an equal number of Madras troops at Cannanore and Mangalore, and under these conditions it would be feasible to reduce the garrison of the west coast from three to two battalions. Long experience has shown that Madras troops are but ill suited for service in the extremely moist and debilitating climate of the coast, and if we can supply their place by locally raised regiments, there would seem to be many advantages in doing so. The Nairs and Mapilahs may possibly meet the case. The former already serve the Maharaja of Travancore in the corps known as the Nair Brigade; while the latter, a race of mixed Arab and Hindu blood, are well known for their fierce courage and muscular energy. If for two of the existing Madras regiments a Mapilah and a Nair battalion could be substituted, the Madras army would probably gain in efficiency. With the reduced number of battalions of the present constitution, and with a new departure in the recruiting rules, it may be hoped that a sufficient number of good men could be obtained to meet the requirements of the Madras Presidency.

With reference to the recruiting rules, I would remark that what we want is a reform in the method of recruiting. Instead of trusting to native recruiting parties and to the products of the regimental lines, we should endeavour to get hold of the best of the agricultural youth of the country through the agency of British officers detailed for recruiting duty. It is thought if this were done, and greater incentives offered by the adoption of the 'class regiments,' that we should get Tamil and

Muhammadan corps of superior quality and efficiency to the regiments now forming the bulk of the Madras army. I do not say that they would be equal to Pathans or Gurkhas, but that they should be and would be, fully equal to the duties the Madras army may reasonably be expected to perform.

There is one more subject to which I must allude before closing this review of the recruiting question; it is that of the garrison of Burma. We have now in Burma a few regiments of so-called Burma Infantry and a dozen or so battalions of the Madras army, but as is well known, it is intended to gradually convert the bulk of the latter into local regiments similar to the four existing battalions of Burma Infantry. Thus we shall eventually have in Burma some ten battalions of Burma Infantry, and according to the requirements of the moment, half a dozen or less regiments of the Madras army.

The local battalions in process of formation are composed of men from northern India, and mostly I believe of Punjabis This, as already remarked in the earlier part of this essay, is somewhat unnecessary. We are thereby reducing the recruiting sources of our best fighting corps, and it is for consideration whether we should not hereafter endeavour to fill the local Burma regiments with men who can be better spared for military duty in so distant a province as Burma.

The Hindustani is specially, it would seem, a fit and appropriate person for this duty. It might also be possible to raise one or two local regiments of Madrasis, which would it is thought attract the most adventurous spirits of the Madras army, and it is suggested that the experiment of local Tamil and Mussulman battalions might at least be tried. They would anyhow be quite as good as the present regiments of the line occupying Burma.

Finally, the subject of local corps in the strict sense of the term might be taken up. We know from past experience, that the Burmans are useless as soldiers, or even as military police, and according to many who are well qualified to judge, the same remark must unfortunately be applied to the Shans. In the Karens, however, we have perhaps a race who might be thus utilized.

In a recent lecture at the United Service Institution,* I spoke in rather deprecating terms of the Karens, but still I thought something might be made of them, and I endeavoured to show that the Karen was a superior fighting animal to the races with which he is likely to come in contact, and that as a political measure it might be well worth while to raise one battalion of Karens for local service.

In any case it is obviously a mistake under present conditions to rob our best regiments of good material for the sake of Burma, when a less efficient article answers sufficiently well for all purposes.

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* See Journal of United Service Institution of India No. 83 of 1890. Article "Indo-China."

It may be useful if I here summarize the conclusions and recommendations arrived at in this paper. They are:—

(1).—That it is not so much that the fighting instinct has been destroyed among Indian races, but that the profession of the soldier no longer offers the same comparative advantages which formerly attracted the best men.

(2).—That economic and political conditions compel us to recruit our armies from all parts of the Indian empire, as well as from beyond our borders.

(3.)—That a few class regiments of Hazara pioneers, Ghilzai infantry, Durani cavalry, and of infantry from the Jalalabad tribes might with advantage be added to the army.

(4.)—That along our North-West Frontier tribal corps of militia might be raised, which could in war be converted into regular regiments. Such a measure would seem to be specially applicable to the Bunerwals, Mohmands, Orakzais, Zaimukhts, and Waziris.

(5.)—The formation of class companies of Adam Khel Afridis, and Orakzais, and Bajauris, in some of our Frontier and Punjab regiments.

(6.)—That it would be most advisable to make a resolute effort to attract Biluchis and Brahnis to our service.

(7.)—The creation of class regiments drawn exclusively from races inhabiting certain frontier districts, and the attraction by this means of clans who do not now enlist.

(8.)—The cessation of recruiting for Burma in the Punjab.

(9.)—That more Punjabi Mussulmans should be enlisted.

(10.)—That more of the Khas division of the Gurkhas should be enlisted, and when opportunity offers, that two Newar battalions of pioneers should be raised for Hindustan and Assam respectively.

(11.)—That there is every reason to suppose, that the quality of the Hindustani recruits forthcoming will improve rather than deteriorate, especially if we adopt the principle of caste regiments.

(12.)—That in Bombay all low castes, and also men from northern India should be eliminated and class regiments formed.

(13.)—That a certain number of African regiments should be raised for service at Aden and in Sindh, as well as for garrison artillery purposes.

(14.)—That in Madras Telingas should be sparingly enlisted, their places being taken by local regiments of Coorgs, Mapilahs, and Nairs.

(15.)—That as elsewhere class regiments should be formed especially as regards Mussulmans and Tamils.

(16.)—That for the garrison of Burma we should recruit chiefly in Hindustan, but should extend the principle of special local regiments to volunteers from the Madras army.

(17.)—That an experimental battalion of Karens might be raised.

In concluding this article, I would wish once more to protest most strongly against the idea that we must in the future depend only on *new* recruiting fields. By all means let us make use of such new fields as present themselves, more especially when they are within the borders of the empire, or within its sphere of influence, but let us be cautious as to the extent to which we introduce new foreign and uncertain elements into our army. The native army is a delicate and sensitive machine requiring careful manipulation. We know that the materials now composing it are fairly good and generally well adapted to the work required. Any alteration in its mechanism should be adopted with great circumspection. Doubtless we can and should make a far greater use of the trans-border tribes, but let us not forget, that in India itself we have splendid material which can be made available, if we employ proper and sufficient means to attract it. Those means are sufficient pay and proper organization. If they fail, it will be time to consider whether we should not make a new and decided departure in the methods of recruiting our army, but above all let us beware of destroying that system of counterpoise in the native army, which has once already proved the salvation of the British rule in India.

IMPENDING ALTERATIONS IN THE "CAVALRY REGULATIONS."

The following are some of the principal alterations in the new Cavalry Regulations which will shortly be published :- -

The pace of the gallop is 15 miles an hour. When Troops are moving at a gallop and a new formation is required, the heads of columns, &c., drop into a canter till the formation is completed, when the gallop is resumed.

2. In forming squadrons (*i. e.*, line) from squadron columns, as a rule the 2nd Troop forms on the right of the leading Troop, the 3rd and 4th Troops on the left. These Troops come up at an increased pace *at the incline.*

3. In forming line of squadron columns from Column of Troops, the 2nd squadron moves on the right of leading squadrons, the remainder on the left.

4. What we have been calling Divisions are now called Troops. A squadron may be divided into three or four Troops; the strength of these Troops is not yet settled, but they are to be either 12 or 16 file, according to the number of men in the ranks.

5. In column, the rear rank is ½ horse's length from front rank; in line, it drops back to one horse's length.

6. Troop leaders are consequently always in front of the centre of their Troops, from which they are ½ horse's length distance in column.

7. In each Troop there are three guides (non-commissioned officers), one in the centre, and one on each flank. The centre guide always follows his Troop leader.

8. There is no turning the head in dressing, except at the halt or on the passing line. Men have to ride straight and keep their touch to the centre of their *Troops*, the general alignment and cohesion of the squadron being secured by the Troop leaders riding parallel with each other and at the proper intervals.

9 All wheels from the halt and all wheels on the move at a walk (with the exception, in both cases, of changes of direction of columns) are made on a fixed pivot. All wheels on the move at a trot or gallop and *all* changes of direction of column are executed on a moving pivot.

The radius of the arc described by the Troop leaders in changing the direction of a column of Troops should equal 1½ times Troop frontage, which in all cases in which the Troops of a squadron are wheeled simultaneously on a moving pivot as from line into column or *vice versâ* equals Troop frontage. In wheeling, the Troop must move up to the ground from which the Troop leader commenced his wheel: the centre guide following in the Troop leader's track at the proper distance.

10. The leader of the centre, or right centre, Troop is termed the directing Troop leader. When the squadron leader personally conducts

his squadron, he rides two horse's lengths in front of this leader, who merely follows him at the prescribed distance.

11. The moment a squadron halts, the Troop leaders correct their alignment or distance, the Troops conforming. The command "Dress" is not to be given unless a critical dressing is required.

12. The Double Column has disappeared from the drill book; it is under consideration whether ½ sections can also be done away with.

13. There are no bases given during field manœuvres, distances and intervals being taken from the directing squadron.

14. There are still two markers for the regiment, but their duties are to mark the passing line in parade movements, and to indicate the position to be taken up by the regiment in the assembly.

15. "Sections right, March." The right front rank section wheels to its right, followed by its rear rank at half horse's length, &c , &c.

"Advance by sections from the right" Right front rank section advances followed by rear rank, remainder front rank sections wheeling to right, &c , &c.

"Retire by sections from the right." Right hand front rank section wheels to the right, again to the right, &c., &c., rear rank moving up to ground on which front rank section stood, &c., &c.

16. In diminishing the front on the move the word is "Advance by sections," "rear halt," when all but the leading front rank section will halt; in increasing the front the command would be "Form fours," "rear trot" as we have always done

In forming Troops on the move ("Form Troops") from single files, &c., &c., each Troop leader gives the word "Rear trot" or "gallop," on which the head of the Troop continues the pace.

When the Troop is formed it is led at an increased pace to its place in column.

17. A "Mass" is in lieu of squadron columns at close intervals, the interval being two horses' lengths.

"Quarter column." Squadrons in column at Troop open column distance from each other and two horses' lengths, so that a wheel of troops to either hand would change the order to that of "Mass."

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His Excellency Sir F. ROBERTS, V. C., R. A., Commander-in-Chief in India, in the Chair.

SMOKELESS POWDERS, THEIR COMPOSITION AND MANUFACTURE.

By Major C. H. SCOTT, R. A.
Superintendent Gunpowder Factory, Ishapore.

THE CHAIRMAN: I believe that the attention of military men could not possibly be directed to a subject of greater importance than the impending adoption of smokeless powder by the armies of European powers. The change from the muzzle-loading to the breech-loading rifle, and from the breech-loading to the magazine rifle, were changes of degree. The increased range and greater projection of modern projectiles are also changes of degree; but the introduction of smokeless powder is a startling innovation, which will certainly do much to revolutionize tactics, and may possibly even change the character of war. Every branch of the service must be more or less affected by it, and as it would be impossible within the limits of these few introductory remarks even to indicate the extent of the change which smokeless powder must produce, I will confine myself to noticing what appears to me to be established by the continental manœuvres of 1890; *first*, that individual marksmanship has assumed an importance unprecedented since the days of the long bow, *secondly*, that fire discipline and control have also increased considerably in importance, and in all probability will in the future be more easily maintained than heretofore, and *thirdly*, that the advantages from the use of this new explosive would appear to be, on the whole, in favour of the defence. The manœuvres which are to be carried on again this year in Europe, and the experiments which I hope will be made in India, will no doubt enable us to form more or less satisfactory conclusions on other than the three points which I have just named, but war alone will be able to give us any real idea of the influence which smokeless powder will have in battle. My belief is, that startling surprises are in store for us; it seems possible that ambuscades will play a more important part in civilised warfare than they have done since the introduction of gunpowder, and that the defeat of large bodies of troops by comparatively insignificant forces will be of more frequent occurrence. Especially is this likely to be the case with the side which is the most highly trained, and which has had an opportunity of gaining a knowledge of the country in which operations may have to be carried on, and is able to take advantage of that knowledge. It is also worthy of note, that where concealment may be of such paramount importance, we in India posses in our khaki a uniform which can hardly be improved upon for fighting purposes. Considering then the great uncertainty of the future, and the possibility that no great length of time may be left us in which to learn our lesson, I am sure you will agree with me, that it would be prudent for us to do all in our power to make ourselves thoroughly acquainted with this new invention, and that the sooner we make extensive experiments in peace time, the better it will be for us in warfare. With these few remarks on smokeless powder, you will understand the particular pleasure it is to me, to introduce to this appreciative audience an officer so well qualified as Major Scott to lecture on a subject, which is at present causing such intense interest to the scientific and military worlds.

YOUR EXCELLENCY, LADIES, AND GENTLEMEN,—When the Council of this Institution did me the honour, through their Secretary, to invite me to give a lecture on smokeless powders, it was with considerable hesitation that I acceded to their request, partly because I am conscious of my inability to do justice to a subject of such great scientific and practical interest, and partly because I am aware of the difficulty which lies before me of making a lecture of such a technical nature intelligible and interesting to those who may not hitherto have devoted much consideration to the question, without at the same time being tedious to those of the audience who may be better acquainted with it than the lecturer himself.

As it does not come within the scope of this lecture to discuss the advantages and disadvantages of smoke on the battlefield, or the changes in the conduct of future campaigns which may be expected to result from the introduction of smokeless powder, I purpose to confine myself, as far as possible, to the few points connected with its composition and manufacture, which can be dealt with in the limits of the brief time at my disposal.

I would however observe, that the general consensus of opinion of those best qualified to judge, appears to be, that the employment of smokeless powder will add immensely to the strength of a defending force, and although perhaps a war is necessary before this and other cognate questions can be definitely settled, yet there can be no doubt of the great disadvantage at which a force provided with only the ordinary black gunpowder would be placed, if opposed to an enemy furnished with the smokeless material. A great deal of literature on this subject has appeared of late, and I would refer you to an interesting article entitled, "the influence of smokeless powder on the tactics of the three arms," published in the Proceedings of the *Militär-Wissenschaftlichen Vereine* for April, a magazine lying on the library table of this Institution.

It is only within the last few years that the serious attention of military authorities at home and abroad has been directed to the question of employing a smokeless explosive as a substitute for gunpowder in artillery and small arms, but it must not therefore be concluded that the subject is a new one, for ever since the year 1846, when guncotton was proposed to take the place of gunpowder by Schonbein, who was the first to make practical application of Pelouze's discovery some eight years previously, that when cotton wool is acted upon by concentrated nitric acid, the cellulose is converted into an explosive substance, the advantages to be derived from the employment of a propelling agent for sporting and military purposes, which without sacrifice of penetrative power would yield less smoke and fouling than ordinary gunpowder, have been more or less recognised; and the efforts of chemists and others have been directed to the production of an explosive, which should not only fulfil these conditions, and combine the comparatively slow action of black and brown powders with the regularity indispensable for military arms, but also possess in a not less degree those other important qualities which render gunpowder so suitable for service purposes, namely, stability under varying climatic conditions, and freedom from liability to explosion by friction and concussion when handled or in transport.

Particulars of some of the numerous attempts which have been made with these objects in view will be found bound up in the records of the various Patent Offices of Europe and the United States. It cannot, however, be said, that as a whole these efforts were attended with any marked success, except perhaps in the cases of sporting powders, and it is only quite recently that any real progress has been made in the development of smokeless powder for military fire-arms. In this respect it is asserted, and apparently with reason, that our neighbours have gone ahead of us, but on the other hand it has to be remembered, that our requirements differ considerably from those of the continental powers. With an army like ours, liable to serve in every quarter of the globe, it is imperative that the smokeless powder issued to it should not only fulfil the conditions of stability so far as can be guaranteed by the application of laboratory tests, but in the words of Sir Frederick Abel, it should "withstand unchanged and unharmed the various vicissitudes of climate, and the service storage conditions in ships and on land in all parts of the world."

It is obvious that considerable time must be allowed in order to complete the experiments requisite to establish the durability and safety of the explosive under these diverse conditions. The English authorities would appear therefore to be acting wisely in deferring the issue of any smokeless powder for general service until the results of the climatic tests now being carried on are known.

In pure guncotton we have an explosive which not only fulfils all the required conditions of stability, but which is also perfectly smokeless as may be seen (Experiment). Owing, however, to the rapidity of its explosion and the difficulty of controlling its action, it has not hitherto been found practicable to use it in its simplest form as a propelling agent. As the difficulty of regulating with certainty the explosion of nitro-powders has been one of the chief hindrances to their employment for military purposes, it may perhaps be as well before proceeding any farther, to refer briefly to the term 'explosion,' which may be defined as the sudden or extremely rapid transformation of a substance in a solid or liquid condition into highly heated and expanded gases occupying a considerably larger volume than the original body.

It can be readily understood, that while the whole amount of force actually exerted by the action of any explosive substance depends on the volume and temperature of the gases or vapour evolved, the explosive effect will greatly depend on the rapidity of the chemical reaction, which in its turn varies with the physical or mechanical state of the substance, and the circumstances under which the explosion is brought about.

Both in guncotton and gunpowder we have striking examples of the influence upon explosion exerted by the physical or mechanical state of the material. When the former is kindled in the open air in the form of loose wool, it flashes off (Experiment), and when spun into thread or woven into webs its rate of combustion is greatly reduced (Experiment).

This is still more noticeable when the explosive is in the form of compressed guncotton (Experiment). In the case of gunpowder the effect of exploding it in the form of small grains is totally different from that observed when it is in the form of large grain or prism (Experiment).

The conditions under which an explosion is brought about also exercise considerable influence upon the effect produced, and very different results are obtained according as an explosive is kindled in the open air, or strongly confined, or detonated.

When compressed guncotton is ignited in the open air by the application of a heated body, it burns slowly as we have just seen, but if enclosed in a strong case and fired, the explosion is so rapid as to resemble the effect of detonation (Experiment). This is attributable to the inflamed gas generated by the first portion of the guncotton being driven back upon and quickly penetrating the remainder. Gunpowder, the rate of explosion of which is comparatively slow in the open, explodes with considerable violence when strongly confined (Experiment).

Detonation, which is the term used to denote an explosion which extends over so short a time as to be practically instantaneous, is usually produced by a small initiative charge of fulminate of mercury, but it may be brought about also by other means. As illustrating the action of a detonator I will fire this small charge of mercuric fulminate (Experiment).

The eminent chemist Sir Frederick Abel has pointed out "that the general action of a detonation in developing the violent explosion of the substance upon which it is allowed to operate, is that of a sudden blow given to some portion of a mass, the particles of which are in a condition to resist the motive or dispersive power of the mechanical force applied ;" and he instances as an illustration of this some experiments carried out of firing with a rifle into slabs of guncotton : "A bullet from a M. H. rifle was fired at a distance of about 50 yards against a slab of compressed guncotton 0·75 inch thick and 3·75 inches in diameter, weighing 4 oz., freely suspended in air by string ; the guncotton was simply perforated by the bullet. A similar result was several times obtained with slabs of guncotton of the same dimensions, and with others double the thickness. On making the experiment with a slab of three times the thickness, the guncotton was inflamed but not detonated by the impact of the bullet ; the passage of the latter was therefore retarded to such an extent as to give rise to the heating of the opposing guncotton particles up to their inflaming point. This experiment was repeated with the same result, but when a bullet was fired against a piece of compressed guncotton four times the thickness of that first employed, and weighing one pound, the result was detonation of the mass."

"It is also found that the very rapid vibration set up among the molecules of the surrounding medium by a detonation will often give rise to the detonation of an explosive body in the neighbourhood, apparently by imparting to its component molecules an amount of vibration destructive of their chemical integrity." Thus a piece of guncotton detonated by means of a few grains of fulminate of mercury will transmit the detonation to more guncotton in the vicinity but not in contact, and the rapidity with which the detonation progresses has been found under certain conditions to range from 17,000 to 24,000 feet per second.

Messrs. Roux and Sarrau have been led by their researches to the conclusion, that most explosive substances will exhibit two kinds of explosions according to the initiative they receive. They will detonate (explosion of the 1st order) under the influence of fulminate of mercury or some other violent explosive, or will deflagrate (explosion of the 2nd order) as in the rapid combustion caused by the ordinary firing of gunpowder.

Taking the explosive force of black gunpowder fired in the usual way as 1, they found that the same powder exhibited a force of 4·34 when detonated. Table I shows the results of their experiments.

Some comparative tests carried out under conditions differing from the above, in Nobel's Factory at Ardeer, in the presence of the lecturer, gave the following results :—

Blasting Gelatine indicated an energy of ...	1,178	ft.	lbs.
Dynamite	780	,,	,,
Blasting Black Gunpowder ignited by a fuze...	202	,,	,,
,, ,, ,, detonated ...	392	,,	,,

The tests were carried out in a mortar suspended like a pendulum and self-registering, the energy being indicated by the recoil of the mortar. The projectile weighed 36 lbs ; a charge of 10 grains in each case was used.

It is also interesting to notice how a charge of the same powder produces very different results when heated in different ways (Experiment). In the first case the combustion is propagated slowly from the particle first touched by the wire, in the second all the particles are raised at once to nearly the same temperature, and as soon as one explodes all the remainder follow instantaneously.

I would remind you that explosions are not necessarily confined to what are technically called explosive substances, for many combustible bodies, when mixed in a finely divided state with air, will under certain conditions burn so rapidly as to produce the effects of an explosion. The aggravation of coal-mine explosions by the fine dust of coal, and the explosions in flour-mills in dry weather are examples. Faraday's experiment which I will endeavour to show you, illustrates this (Experiment).

To return now to our subject, from which I fear I have made too long a digression. Soon after the discovery of guncotton extensive experiments were carried out in Austria under the direction of General von Lenk, an artillery officer, to improve its manufacture and control its rate of combustion, so as to render its application possible to small arms and cannon. The method by which he sought to moderate the rapidity of explosion was by weaving the yarns of guncotton into charges of various shapes and sizes, or by twisting and plaiting it tightly round a core of wood. By this means he was able to modify the rate of combustion in the air, but it was found practically impossible to regulate with certainty the explosive force of the guncotton when confined in the bore of a gun, and the unsatisfactory results obtained led to its abandonment by the Austrian government as an explosive for field guns and small arms.

Similar experiments using compressed guncotton were carried out in England in 1867 under the superintendence of Sir Frederick Abel, but the results obtained in field guns were not considered sufficiently promising to warrant the continuance of the trials. Better results, however, were obtained in small arms, and there is no doubt that if the matter had not been allowed to drop, the difficulty of regulating the explosion would have been overcome, and the British Army could, if desired, have been furnished long ere this with a suitable smokeless powder for its M. H. rifle.

During the succeeding years several smokeless or semi-smokeless sporting powders were brought out, of which the Schultz, E. C., and J. B. are the best known, The composition of these according to Colonel Cundill, is shown in Tables II, III, IV. It will be observed that nitro-cellulose is the principal constituent of all these powders, the only difference being that in the Schultze the cellulose is in the form of wood-fibre, and in the others in that of cotton, which is the purest description of cellulose.

The wood-fibre for Schultze's powder is prepared from any kind of wood free from resinous matter and containing a small percentage of mineral matter, treated with a well cooled mixture of three parts of sulphuric acid and one part of pure concentrated nitric acid, and then thoroughly washed so as to remove every trace of free acid. The nitro-lignin thus formed is incorporated with the nitrates of potassium and barium, and a waterproofing ingredient (paraffin), and a small quantity of alkali. After incorporation the material is pressed, granulated, and finished in the usual way.

The E. C. powders are composed of nitro-cellulose incorporated with nitrates of potassium and barium, and coloured either an orange colour with aurine, or yellow with picric acid, to distinguish the sporting from the rifle powder.

The J. B. powders are made with di-nitro-cellulose, that is, with a nitro cellulose of a lower degree of nitration than ordinary guncotton, then incorporated with oxidising agents as the nitrates of potassium and barium, and with torrefied starch or lamp-black, in the proportions shown in the Table. After incorporation the material is made into grain or moulded into cylinders, prisms, or cubes. These grains or blocks are then saturated with a solution of camphor and phenol. The volatile solvent is then driven off at the lowest possible temperature, leaving the camphor disseminated throughout the grains or blocks. These are afterwards heated at varying temperatures up to 100° C., by which treatment they are rendered of any required hardness according to the percentage of camphor used. The camphor is subsequently driven off by sublimation under reduced pressures, or washed out with a solvent which has no action upon the nitro-cellulose or any other substance in admixture therewith.

The first real advance in the development of smokeless powder for military arms was made about four years ago when it was adopted by the French government. The particular form of explosive then selected has since been superseded by another description, to which reference will be made later on, but the secret of its composition appears to have been well kept, although it was understood to contain nitro-cotton and picric acid. In appearance this powder was said to be in the form of small yellowish brown tablets of about 0·07 inch to 0·1 inch square, of the thickness of stout notepaper. A similar description of paper powder was subsequently prepared by the Wetteren Powder Company, and the lecturer witnessed some trials carried out with it in their factory, the results obtained in a Belgian rifle being very satisfactory.

About this time a powder for artillery purposes known as Amide Powder was introduced into England by the Chilworth Gunpowder Company. This powder is not smokeless, but produces much less smoke than ordinary gunpowder, and the smoke disperses very quickly. The chief particulars in which it differs from black powder are the substitution of nitrate of ammonia for a portion of the saltpetre, the larger proportion of charcoal (specially prepared), and the small proportion of sulphur. The composition of two samples is shown in Table V. Nitrate of ammonia is, however, a highly deliquescent salt, and as the results obtained with this powder were not considered sufficiently good, it was not adopted by the War Office.

While experiments were being carried on with Amide Powder, the Chilworth Company brought forward a nitro-powder for small arms, known as Düttenhoffer Powder after the talented German who invented it. This explosive, which has nitro-cotton for its base, is in the form of black, highly-glazed, fine, irregular grains. Excellent ballistics in the ·303 magazine rifle were obtained with it, a charge of 42·5 grains giving a muzzle velocity of 2000 f. s. with gas pressures under 20 tons on the square inch. It is not quite smokeless, but forms a thin smoke which rapidly disperses. It was, it is understood, provisionally adopted in the German service, and probably would have had a future, if a superior powder invented by Nobel had not appeared on the scene to supersede it.

At the present moment Nobel's powder or modifications of it are used by every European power which has adopted a smokeless explosive for artillery and small arms, and it is interesting to trace how its invention was brought about.

In the history of high explosives the names of two men, Frederick Abel, and Alfred Nobel, will ever stand out conspicuous, the former in connection with the manufacture of guncotton, and the latter with that of nitro-glycerine and the blasting agents of which it is the basis.

It is to Sir Frederick Abel we are chiefly indebted for having rescued guncotton from the discredit it had fallen into as an explosive, consequent on the disastrous explosions which occurred with it from time to time, when first its manufacture was undertaken on a large scale. It was he who discovered the process by which a perfectly stable guncotton can be prepared, and compressed into thoroughly compact homogeneous masses of any desired shape. One of the merits of this discovery is that the greatest amount of safety is secured, as the guncotton is manufactured throughout in a wet state, and can also be transported, and stored, and exploded in the same condition.

Nitro-glycerine was discovered within two years of guncotton, but for many years it was regarded as an useless and extremely dangerous chemical product, until Mr. Alfred Nobel discovered that it could be detonated by means of fulminate of mercury, when it was at once raised to the position of a most important explosive for industrial purposes. He also introduced many improvements into the manufacture and purification of the material. So many terrible accidents, however, occurred with it when used in its liquid condition, that an Act was passed in 1869, prohibiting its employment in the United Kingdom in this form. Fortunately Nobel had anticipated this order, and he proposed, apparently at first with the sole object of diminishing the risks attending the storage and transport of the liquid nitro-glycerine, that it should be incorporated with a remarkably porous variety of silica, known as 'kieselghur,' found chiefly in Hanover. It was his original intention that the nitro-glycerine should be separated from the absorbent before use, but experience showed that this was unnecessery, as the incorporated material, to which the name of dynamite was given, could be used without seriously diminishing the explosive effect, and could also be detonated with even greater certainty than the liquid nitro-glycerine. This not only enabled the troublesome and risky operation of extracting the liquid from the kieselghur to be dispensed with, but it also did away with the danger of using the explosive in its liquid form.

This discovery led to proposals of various other descriptions of absorbents, some of which themselves possessed explosive properties, but I shall only refer to two, as being specially connected with our subject, namely, Abel's Glyoxylin, and Nobel's Blasting-Gelatine. The former preparation was devised by Sir Frederick Abel shortly after the elaboration of his process of producing compressed and granulated guncotton, and consists in saturating guncotton with nitro-glycerine, the latter being absorbed by the porous masses of guncotton. Nobel found, however, that, if instead of employing the most explosive form of guncotton (tri-nitro-cellulose), he added from 7 to 10 per cent of soluble or collodion guncotton (di-nitro-cellulose) to from 93 to 90 per cent. of nitro-glycerine, and allowed it to digest, the liquid exerted a peculiar solvent action upon it, producing a gelatinised mass of great consistency and explosive power. This preparation is known as Blasting-Gelatine.

From Blasting-Gelatine has been derived Nobel's Smokeless Powder, to which the name Ballistite has been given, and which either in its original form or in modifications has been generally adopted on the Continent, and our own Cordite.

Ballistite is composed of equal parts of nitro-glycerine and soluble guncotton, with which is mixed, though not necessarily, small quantities of Benzole, Camphor, or Anniline. The mode of manufacture consists in incorporating, say, 100 parts of nitro-glycerine with so much wet soluble guncotton (not containing more than 30 per cent. of water) as contains, say, 100 parts of dry guncotton, the operation being carried on at from 41° to 50° Fahr., and continued until only water escapes on squeezing the material, and all the nitro-glycerine has been well absorbed in the nitro-cotton. The mass is then divided into small fragments and immersed in hot water at 176° Fahr. for an hour, when it becomes well gelatinised. It is then treated between steam-heated rollers, until plates or sheets of uniform horny or semi-horny aspect have been obtained, which are then cut up into grains. The operation of passing the material through the rollers is repeated several times, the thickness of the plates depending on the size of the grain required. This powder is absolutely smokeless. Excellent ballistics have been obtained with it, and an interesting account of some experiments carried out by Krupp last year, was published in the *Schweizerische Zeitschrift für Artillerie und Genie* for December 1890. I am indebted to that periodical for the Tables and other particulars regarding the trials to which I am now about to refer.

Table VI shows the comparative ballistics of Ballistite and ordinary black powder, from which it will be seen that the former gives the same muzzle velocity with lower pressures, and it is therefore practicable to increase the velocity without unduly straining the gun.

Table VII gives the results of some experiments carried out with Ballistite made up into different sizes of grain.

Table VIII shows the result of an experiment to ascertain the effect of storing the powder in a magazine kept heated to a temperature of 50° C., and it will be seen, that after being exposed to this temperature for 10 days, the ballistics were not appreciably affected.

Table IX gives the result of an experiment carried out to test the effect of cold. Three charges of 0·75 kg. and three of 1·10 kg. were placed for 24 hours in a magazine cooled down to 15°C., and afterwards fired in an 8·7 c. m. gun, the projectile weighing 6·8 kilograms. The results showed that the smokeless powder lost a good deal in velocity, but the uniformity was not affected.

It is also found that this powder is not injured by immersion in water. A sample was left in water for 30 minutes, and then removed and dried, On being fired in a gun, it was found to give the same velocity as before immersion.

It also appears to be more impervious to weather than black powder. At Meppen some of this powder was placed in a cotton bag and suspended in an open wooden shed from the 9th January to the 10th February. On being tested in a gun it was found to give only 33 f. s. less muzzle velocity than before the trial. With black gunpowder the difference would have been much greater.

A variety of Ballistite in which graphite is incorporated with the material, has been introduced by the Chilworth Company. The addition of graphite no doubt facilitates the operation of filling small arms cartridge cases, as well as serving as a moderator.

We now come to Cordite, so-called from the form of cord or wire in which it is made. This description of nitro-glycerine powder was invented by the War Office Committee on explosives. It differs from Nobel's powder, in that insoluble guncotton (tri-nitro-cellulose) or the highest nitrated varieties of nitro-cellulose are used instead of the soluble nitro-cotton. This is dissolved in a solvent such as acetone or acetic ether, and added to the nitro-glycerine together with some other substance for moderating the explosive action, such as lamp-black, graphite, solid hydro-carbons, oils, fats, tannin, cellulose, oxalate of ammonia, and nitro-derivatives of hydro-carbons. An explosive of gelatinous consistency is thus produced, which is afterwards formed into rods of any desired diameter.

The mode of manufacture, as described in the various patents which have been published, is briefly as follows. Equal parts by weight of nitro-glycerine and dry guncotton are taken, and after mixing with the nitro-glycerine about one-sixth of the weight of the solvent, the guncotton and moderator (if used) are added, and the whole of the ingredients are thoroughly incorporated in a kneading machine until the material becomes of an uniform consistency, similar to a stiff jelly. Or, if desired, the guncotton may be first gelatinised in the solvent, and then the nitro-glycerine added. A pugmill is attached to the kneading machine, and as soon as the incorporation is completed, the contents of the kneader are discharged into the pugmill, and the mixture is forced out through a die, and cut into suitable lengths. These lengths are then transferred to the wire or rod making machine to be converted into flexible wires or rods. This machine is somewhat similar to a lead-squirting machine for the manufacture of bullets, and consists of a strong cylinder in which a close fitting ram works. The cylinder is held in a frame and has one end closed with the exception of a small hole made in the die of the diameter to produce the required size of wire or rod. When the pressure is given, the cordite is forced out in the form of a string and led on to a reel on which it is coiled. As soon as a sufficient quantity of the material has been wound on, the reel is inserted in a drying apparatus consisting of a cylinder or pipe of rather larger diameter than the reels, surrounded by a hot water or steam jacket, and fitted with doors which can be readily opened. A continuous current of air is drawn through the cylinder, and after thoroughly drying, the cordite is ready for filling into cartridges.

The cartridge-filling machine consists of a short metal gathering tube, a little larger in diameter than the cartridge case, secured to a suitable frame. The reels are placed in a frame to the number required for filling a cartridge, and the wires to the required number are collected, passed through eyes, and gradually concentrated into the gathering tube, then grasped by a lever-clip which draws the bundle of wires through the gathering tube and pushes it through a guide tube into the cartridge case, when the bundle is severed; the cartridge is thus filled and ready to receive the bullet.

The drawings marked A, B, and C represent the machines employed for converting the explosive into cordite wires or rods, for winding these on reels, and for charging cartridge cases with them.

I have here samples of cordite both for the ·303 magazine rifle and field guns, that for the latter being of larger diameter than for the rifle. It will be seen that it burns very slowly in the open air, and is absolutely smokeless (Experiment). This powder gives excellent ballistics in the ·303 rifle, namely, a muzzle velocity of 2,200 f. s. with pressures not exceeding 18 tons. The results obtained in field, quick-firing, and other guns up to the 6-inch have been extremely satisfactory, and specifications to guide its acceptance for supply have been drawn up and published.

Laboratory tests have demonstrated that cordite will stand exposure to temperatures varying from freezing to 200° Fahr. without an appreciable effect on its ballistic properties. Experiments are now being undertaken in India to ascertain the effect upon it of prolonged storage and exposure to heat; and although it would be premature to anticipate the results, yet there is every reason to believe they will prove favourable. The tests which are being applied are of a most stringent character, and should show conclusively whether the powder is suitable for use in this country.

Time will not allow me to refer to the many patents which have been taken out by Maxim and others for the manufacture of smokeless powders, but I might mention that they are nearly all composed of some form of nitro-cotton combined with other substances.

As guncotton and nitro-glycerine form the principal ingredients of cordite, this lecture would be incomplete without some reference being made to their constitution and manufacture. This I will do briefly, without entering into details.

Guncotton, also called Pyroxyline, and Tri-nitro-cellulose, was formerly considered a true nitro-substitution product, but is now recognised to be a nitric ether, and is known as the hexnitrate of cellulose, the formula for it being $C_6 H_7 O_2 3 N O_3$, the formula for cellulose being taken as $C_6 H_7 O_2 3 H. O$.

Guncotton is produced by the action of concentrated nitric acid on raw cotton.

$C_6 H_7 O_2 3 H O + 3 H N O_3 = C_6 H_7 O_2 3 N O_3$.

If this equation could be realized in practice, 189 parts by weight of nitric acid should suffice to convert 162 parts of cellulose into guncotton which would weigh 297 parts. But the cellulose is not all simultaneously acted on by the acid, and the water which is formed in the conversion of the cellulose dilutes the remainder of the nitric acid, and weakens it, so that the conversion of the cellulose into guncotton is not complete. To remedy this strong sulphuric acid which has a great affinity for water is added to the nitric acid. There is always, however, a small proportion of soluble guncotton produced (from 6 to 12 per cent.).

For the preparation of guncotton the best white cotton waste is used, which has previously been thoroughly freed from waxy or fatty matter by boiling in a dilute solution of potassium carbonate, which dissolves all the impurities, and leaves the cellulose, which is then well washed with water and dried.

The processes of maufacture as carried on at Waltham are shown in Table X. Briefly, we may say, they consist in immersing the purified well-dried cotton waste into about 11 parts of a mixture of one part of nitric acid of Specific Gravity 1·5, and 3 parts of sulphuric acid of Specific Gravity 1·85, and allowing it to digest for 24 hours. After washing, the material is placed in a washing engine such as is used in paper manufacture, and the pulped and washed mass pressed into cylinders.

Di-nitro-cellulose or soluble guncotton is produced by the action of less concentrated acids on cotton waste.

The composition of guncotton and the products of explosion are shown in Table XI. Theoretically, 100 parts by weight of cellulose should produce 218·4 parts of guncotton, but practically the yield is less. The products of combustion are acid, as may be seen by the following experiment. It will be observed that immediately after the explosion, the gas within the cylinder is colourless, but it soon becomes red, shewing that nitric oxide was present among the products, and became converted into nitrous acid and nitric peroxide by the oxygen of the air. Hence the acid character of the moisture deposited in the bore of a gun.

We have already noticed some of the properties of guncotton. On ignition it burns very rapidly, and, unlike powder, leaves no residue. A floating crucible which rides out the explosion of guncotton is sunk by an equivalent charge of gunpowder (Expt.). Guncotton may be fired on the palm of the hand without scorching the skin (Expt.), and when placed on some gunpowder, it may be fired without igniting it, although the temperature of the flame is higher than the inflaming point of gunpowder (Expt.).

A well-moistened disc of compressed guncotton may have a hole bored through it with a red hot iron, with as little danger as a piece of wood. (Expt.) Guncotton explodes more easily than gunpowder, the latter requiring a temperature of at least 600° Fahr., whilst the former may explode at 277° Fahr. and must explode at 400° Fahr. This may be illustrated by kindling some guncotton by means of a hot glass rod which will fail to fire gunpowder (Expt.).

Guncotton can be readily exploded by percussion, while it is very difficult to explode gunpowder in this way (Expt.).

Nitro-glycerine, also known as glonoine and blasting oil, was discovered about 1846 or 1847 by Sobrero, who obtained it by dissolving glycerine in a mixture of strong nitric and sulphuric acids. Nitro-glycerine bears to glycerine the same relation as guncotton has to cellulose. The equation for its formation is represented thus:—

$$\underset{\text{Glycerine.}}{C_3H_8O_3} + \underset{\text{Nitric acid.}}{3(HNO_3)} = \underset{\text{Nitro-glycerine.}}{C_3H_5(NO_3)_3} + \underset{\text{Water.}}{3H_2O}$$

Its composition is shown in Table XII.

For the manufacture of nitro-glycerine as carried out at Nobel's Factory, Ardeer, the acids in the proportion of 1·2 parts of nitric acid (S. G. 1·50) to 2 parts of sulphuric acid (S. G. 1·84) are mixed in large tanks by means of an air blower, and allowed to thoroughly cool. 3·2 tons of the mixed acids are run by the action of gravity into a large leaden tank surrounded by cold water, provision being made to ensure a constant circulation of the same. The mixed acids are kept in a state of agitation by an air-blower, and 7½ cwts. of glycerine (S. G. 1·26) are gradually added in the form of a fine spray, care being taken that the temperature does not rise above a certain limit, arrangements being made, if it should do so, to cut off the supply of glycerine and increase the agitation. Provision is also made to allow the contents of the nitrating tank to be drowned, should the chemical action become dangerously energetic.

As soon as the nitration process is completed, which is indicated by the fall of the thermometer, the mixture is allowed to settle, and is then run off in small quantities at a time into a large tank where it separates out from the acids. It is then drawn off into another tank and washed repeatedly with water to remove every trace of free acid, and prevent spontaneous combustion, a little alkali being added to the last washings. It is eventually filtered into another tank, and is then ready for use.

Glycerine is extracted from the natural oils and fats when they are converted into soap and candles. Only a very pure description of glycerine is used in the manufacture of nitro-glycerine. It is tested before use, for lime, arsenic, chlorides, colour, reduction, nitration, and specific gravity. The reduction test is carried out with nitrate of silver, after the addition of which the sample of glycerine is allowed to stand for one hour, during which time it should remain perfectly clear. If the reduction test is not good the nitration of the glycerine will be bad, and the result will be an inferior nitro-glycerine.

I have here a small sample of nitro-glycerine, which I prepared just before the commencement of this lecture. As it is rather a dangerous substance, exploding with frightful force on even slight percussion, perhaps the ladies will excuse my not passing it round for their inspection.

It is not easily inflammable, and when ignited burns without explosion, but the explosive effect on percussion is very violent.

The question of undertaking the manufacture in this country of cordite and its ingredients has been for some time past under the consideration of the Government of India, and no doubt steps will be taken to import the requisite machinery, as soon as the results of the climatic trials already referred to are known, and the powder is definitely adopted into the service.

Owing to the low temperature required for the safe and efficient manufacture of both guncotton and nitro-glycerine, it will be necessary to provide some suitable description of refrigerating apparatus, in order to reduce the temperature in the buildings where the nitrating processes will be carried on

If time had permitted, I should have liked to refer to picric acid, a sample of which you see on this table. Large quantities of this explosive have been laid in by the French and German Governments, and no doubt it will be heard of when the next war occurs.

It is obvious that the days of black powder are numbered, and as one who has been closely connected with its manufacture in India for the past twelve years, I may be allowed to feel some regret that this should be the case. It is impossible to forget what an influence its employment has had on the history of the world, and how that until quite recently it has held its own against every other explosive. As has been pointed out by one of its admirers, it possesses a power of adapting itself to purposes of the most varied nature. " In a mine it blasts without propelling, in a gun it propels without blasting, in a shell it serves both purposes combined, in a fuze as in fireworks it burns slowly without exploding. Its pressure exercised in these numerous operations varies between one ounce more or less to the square inch in a fuze and 85,000 lbs to the square inch in a shell."

I must now draw my remarks to a close. I am deeply sensible of the imperfect treatment this interesting subject has received at my hands, and I am therefore the more indebted to you for the patience with which you have listened to this lecture.

TABLE I.

Showing the force of the two kinds of explosion, detonation, 1st order, and deflagration, 2nd order.

	Explosive Force.	
	1st order.	2nd order.
Gunpowder..	4·34	1·00
Guncotton	6·46	3·00
Nitro-glycerine	10·13	4·80
Fulminate of Mercury	9·28	...

TABLE II,

Composition of Schultze Gunpowder.

	Parts.
Soluble Nitro-lignin	24·83
Insoluble ,,	23·36
Lignin (unconverted)	13·14
Nitrates of Potassium and Barium	32·35
Paraffin	3·65
Matters soluble in alcohol	0·11
Water	2·56

TABLE III,

Composition of E. C. Powders.

Two samples gave—

	Parts.	Parts.
Nitro-cellulose, soluble	27·95	21·79
,, insoluble	28·35	25·58
Cellulose (unconverted)	3·15	4·17
Nitrates of Potassium and Barium	37·80	38·32
Matters soluble in Benzole	0·60	1·95
,, ,, ,, Alcohol	2·15	1·95
Water		1·87

TABLE IV.

Composition of J. B. Powders.

	For Military Arms.	For Sporting Arms.
Nitro-cellulose	50 parts.	50 parts.
Nitrate of Potassium	40 ,,	22 ,,
,, Barium		25 ,,
Torrefied starch or lamp black	10 ,,	3 ,,

TABLE V,

Composition of Amide Powder.

Two samples gave—

	A. p. c.	B. p. c.
Nitrate of Potassium	44·90	45·89
,, Ammonia	27·59	27·12
Charcoal	26·02	26·19
Sulphur	1·49	0·80

TABLE VI.

Description of explosive.	Size of Grain M. M.	Gun. Calibre C.M.	Gun. Weight Kg.	Weight of projectile Kg.	Weight of charge Kg.	Muzzle velocity. Metres per second.	Pressure Atmospheres.
Gunpowder	6 to 10	7·5	300	4·3	1·0	465	1800
Ballistite	...	...	...	...	0·35	485	1295
Gunpowder	6 to 10	8·7	450	6·8	1·5	460	2000
Ballistite	...	...	...	...	0·5	463	1474
Gunpowder	Prism	10·5	1200	·18	4·0	461	2100
Ballistite	..	..	...	...	1·6	473	1340

TABLE VII.

Gun.		Weight of projectile Kg.	Ballistite.		Muzzle velocity. Metres per second.	Pressure Atmospheres.
Calibre C. M.	Weight Kg.		Weight of charge Kg.	Size of grain M. M.		
8·4	460	7·0	0·80	4	583	245
			1·00	5	589	2205
8·7	446	6·8	0·75	3	581	2025
			0·80	4	580	2125
10·5	1200	18	2·00	5	567	2070
			2·00	7½	565	2025

TABLE VIII.

Gun.	Charge.		Muzzle velocity. Metres per second.	Pressure Atmospheres.
	Weight Kg.	Experiment.		
8·7 C. M.		Before being placed in Magazine ...	581	2024
Field gun ...		Exposed for 1 day at 50°C. ...	584	2221
	0·75	„ „ 2 days „ „ ..	574	2205
		„ „ 3 „ „ „ ...	579	2122
		„ „ 10 „ „ „ ..	577	2271

TABLE IX.

Charge.			Observed velocity at 50 metres. Metres per second.		Pressure Atmospheres.	
Size of grain M. M.	Weight Kg.	Experiment.				
				+0·8		+83
		Before being placed in Magazine	553·2	—1·2	1924	—49
3	0·75			+2·7		+49
		Exposed for 24 hours at 15° C.	531·8	—1·8	2106	—50
				+1·3		+52
		Before being placed in Magazine	573·7	—2·2	1856	—71
5	1·10			+1·55		+33
		Exposed for 24 hours at 15° C.	544·7	—2·75	2040	—33

TABLE X.

Processes of Manufacture of Guncotton.

	No.	
Preparing the cotton ...	1	Picking over.
	2	Teasing.
	3	Cutting.
	4	Drying.
	5	Weighing.
Chemical Processes ...	6	Mixing the acids.
	7	Dipping.
	8	Extracting the acids.
	9	Immersing.
	10	Wringing.
	11	1st boiling.
	12	2nd boiling.
Mechanical Processes ...	13	Beating or pulping.
	14	Poaching.
	15	Adding alkali & drawing into stuff chest.
	16	Moulding.
	17	Pressing.
Testing	1	Alkalinity test.
	2	Heat (or colour) test.
	3	Solubility test.
	4	Test for unconverted cotton.
Re-working Guncotton ...	1	Boiling.
	2	Broken up.
	3	Pulped.

TABLE XI.

Composition of Guncotton.

Chemical Formula—$C_6 H_7 N_3 O_{11}$

	In one molecule.	In 100 parts.
6 atoms carbon	72	24·24
7 „ hydrogen	7	2·36
3 „ nitrogen	42	14·14
11 „ oxygen	176	59·26
Molecular weight of guncotton...	297	100·00

Composition of products of explosion of guncotton, in 100 volumes.

Water vapour	35·34	vols.
Carbonic oxide	28·95	„
Carbon di-oxide	20·82	„
Nitrogen	12·67	
Hydrogen	3·16	
Marsh gas...	7·24	

TABLE XII.

Composition of Nitro-glycerine.

Chemical Formula—$C_3 H_5 N_3 O_9$.

	In one molecule.	In 100 parts.
3 atoms carbon	36	15·86
5 „ hydrogen...	5	2·20
3 „ nitrogen	42	18·50
9 „ oxygen	144	63·44
Molecular weight...	227	100·00

Major-General E. H. H. Collen c. i. e.: Your Excellency, Ladies, and Gentlemen,—In the early part of his lecture Major Scott mentioned that it did not come within the scope of his subject to deal with the effects which the invention of smokeless powder might have upon the tactical operations of the future, and he alluded to an Austrian military publication to which he referred us for the discussion of this part of the subject. But I think you will agree with me, that we need not go so far afield, because in the April number of the Journal of the Royal United Service Institution we have a very excellent paper, I think it was the prize essay by Captain Benson R. A., on the tactics of the future, in which he gives us a capital résumé of all that has been written, or experienced in manœuvres, of the effects of smokeless powder on tactical operations. After what the Commander-in-Chief has said, I should not feel that I could properly enlarge on this part of the subject, because we all know—I need hardly remind such an audience as this—that His Excellency has done more for the shooting of the British and Native Army in India than any one living. Indeed, I might almost say that Sir Frederick Roberts has succeeded in improving the shooting of the British Army all over the would, for we are presumptuous enough to think that the British Army generally has followed the example set by that portion of it which serves in India. Major Scott mentioned, I think, that experiments were being carried on at Mian Mir to test the effects of the climate upon cordite cartridges, and I fancy you will agree with me, that if these cartridges stand the experiment of exposure in gun limber boxes in the heat of a Mian Mir hot weather, they will probably stand any heat which may be experienced in this country. I should, however, like to ask the lecturer what would be the possible effect of subjecting the cartridges to other climatic conditions, such as great damp at high temperatures, or at great elevations; and there is a further point upon which it would I think be interesting to enquire *viz.*, is the cordite cartridge much lighter than the ordinary cartridge? I gather that it is so, but if we are assured that this is the case, then we shall have the satisfaction of knowing that the troops will be able to carry more cartridges than we do now, and that would be an inestimable advantage in Indian campaigns. I should like to revert to one point which has occurred to me, and that is the advantage which smokeless powder will confer upon the troops employed in frontier campaigns or in Indian wars generally. It seems to me that the use of smokeless powder will give us a considerable superiority, as we may hope that the spread of civilisation may not include the use of cordite cartridges against ourselves, at all events for many years to come.

I do not think I shall bring myself within the pains and penalties of the "Official Secrets Act," if I mention, that at the instance of the Commander-in-Chief, the Government of India have asked the authorities at home whether it is possible to manufacture Martini-Henry cordite cartridges, so that we might have an experiment on a very large scale all over India. And as regards manufacture, everything has been prepared in the way of reports and plans and estimates for the establishment of a factory for high explosives in this country, so that directly there is evidence to show the keeping quality of cordite in an Indian climate, and the experiments have been conducted to a successful issue, orders can be given to purchase the machinery and start the factory as soon as possible.

I daresay many here remember those lengthy "notes on gunpowder," which cadets used to have to write at the Royal Military Academy, Woolwich. There is, I am sorry to say, only one sentence in those notes which has impressed itself on my memory, and that is the following:—"The history of gunpowder is shrouded in mystery." Now, ladies and gentlemen, that was I fear a sentence which the cadets were only too ready to write down, because they naturally felt, that if their instructor informed them that the history of gunpowder was a mystery, they would not be compelled to enquire into it. We have no longer this excuse. Major Scott has plucked out the heart of the mystery, and he has given us an excellent history of smokeless powder. He has taught us a great deal on the subject, and much more about smokeless powder and its history, than we could have possibly learned without the aid of his excellent lecture, diversified as it has been by interesting experiments.

Major-General A. Walker, C.B., R.A.: Your Excellency, Ladies, and Gentlemen,—I think I am correct in stating, that this is the first time that an Officer of the Ordnance Department in India has delivered a lecture on a technical subject in the United Service Institution of India. From the way that this lecture has been received, I may express a hope that it will not be the last. The lecturer Major Scott, the able superintendent of the Ishapore Gunpowder Factory, has taken full advantage of the opportunities that were accorded him for acquiring in India, England, and the Continent of Europe, the latest particulars regarding the properties and manufacture of smokeless powder. In addition to this, whilst in England in 1889-1890, he learnt the secret of the manufacture of what are known as prism brown powders. These powders are used in the ordnance mounted on our coast defences. You will be surprised when I tell you, that the open secret of the manufacture of these powders was not obtained from the officials of the War Department, London, who refused to let Major Scott see how the powder was made at the Royal Gunpowder Factory, Waltham Abbey, but from the officials of gunpowder factories on the Continent of Europe. Before Major Scott went to the Continent, enquiries were made of private makers of gunpowder in England, if they were prepared to afford the necessary information. They declined to do this, unless they were paid a royalty of some £ 15,000. This offer was declined with thanks. In this connection, I would here beg publicly to thank Messrs. Gruson and Company, Magdeburg, for the able and businesslike way they supplied the machinery for the manufacture of this powder in India. Thus, both the process of manufacture and the machinery had to be obtained from the Continent. Before Major Scott went to England on duty in 1888, he had studied theoretical and political chemistry at the Medical College Laboratory, Calcutta, under the able and talented Chemical Analyser to the Government of Bengal, Dr. Warden, a Chemist of European reputation I am much indebted to Dr. Warden for the trouble he took in instructing an officer of the Ordnance Department with such good results, that he was able to take hold of the secret that was imparted to him with a saving to Government of something like £ 15,000. The master and the pupil were worthy of each other. Unhappily for the Ordnance Department, Major Scott's connection with it will for a time cease, and he will not have the opportunity of introducing the manufacture of smokeless powders into India. I trust that ere his departure, he will throw upon his successor's shoulders his mantle of sound scientific training, resource, judgment, and perseverance. All these qualities will be required in the officer who first undertakes the manufacture of smokeless powder in the plains of India. The first great difficulty will be the heat. The nitro compounds cannot be worked in a tropical climate. To meet this difficulty, recourse will have to be made to use refrigerating apparatus to keep the temperature of the rooms as low as 50° Fahrenheit. Messrs. Haslam, of the Union Foundry, Derby, have invented such an apparatus, which works successfully in the P. and O. Company, Oriental Line, and New Zealand Company Steamers. This is a great invention, and is known as the dry air system of refrigeration. All the materials necessary for the manufacture of smokeless powder can be obtained locally. . Cotton we all know grows in India. The acids of required strength and purity are made in Calcutta, and I hope that the soap manufacturers in India will be able to supply the glycerine. The days of smoke producing powders are numbered, and I am certain that the time has now come for the Indian Government to take up the question of its manufacture. This Department has now in England an enthusiastic and able officer, Colonel Caldecott, who has written to me urging that an experimental plant for making smokeless powders should be demanded at once, set up, and tried at Kirkee. I am against any experimental plant: we must face the manufacture in quantity and not experimentally. Another officer leaves India next month, Captain Muspratt Williams, to learn the details of manufacture. This officer has been fortunate enough to have received instruction from Major Scott. I anticipate that this officer on his return will successfully introduce this manufacture at Ishapore. Before concluding, I would like to give it as my opinion, that smokeless powder might with advantage be tried in the Martini-Henry rifles that are now in the hands of the British and Native soldiers in India. In Colonel Stone, the superintendent of the Small Arms Ammunition Factory at Dum Dum the Government of India have an officer who is experienced in the making up of cartridges. If smokeless powder were supplied from England, this able officer would be in a position to devise a cartridge for its use. It is worth a trial. Smokeless powder must in time come into use with all arms of the service.

LIEUT.-COLONEL IAN HAMILTON, D. S. O.: My excuse for rising at so late an hour to take part in this discussion is, that although I am not qualified to deal with the smokeless powder question from the scientific point of view, I nevertheless believe it may interest the meeting to hear my personal experiences in regard to its practical use. Last autumn, whilst I was at home on leave, the Director General of Artillery was kind enough to invite me to be present at some experiments which were being carried out, with the object of ascertaining whether cordite would give good results when fired from the maxim machine gun. This was in September, and at that period my entire attention was being devoted to a close study of the effects of E. C. powder and No. 6 shot upon certain moving and vanishing targets which are mainly to be found upon the moors of Scotland. Consequently I was unable to put in an appearance upon this occasion, but shortly afterwards I was able to arrange a separate visit to Mr. Maxim's works, which I had the pleasure of inspecting in company with an Agent from the Congo States. This gentleman was anxious to civilize his section of the dark continent by the methods just alluded to by General Collen to civilize it in short with a maximum of rapidity. During my visit I fired 500 rounds of smokeless powder out of the ·450 gun, together with some 100 rounds out of the only ·303 maxim then in existence. The firing was at the rate of about 600 rounds a minute, without a single hitch or jam, and yet, even at this almost phenomenal rate of speed, the thin yellow mist rising from the muzzle never for a moment became so opaque as to obscure the mark on the opposite wall at which I was directing my aim. The noise seemed to me about equivalent in volume to that produced by black powder, but the reports were of a sharper character and consequently more disagreeable to the ear of the firer. Apart from the unwonted facility in aiming which I experienced on this occasion, it must be apparent to every one, that the introduction of smokeless powder has effected a tremendous revolution in the position and relative value of machine guns when compared with the other arms. I have often watched the improved Gatlings at work in the Pindi District, both on field days and at field firing, both in attack and whilst engaged on the defensive, and never, I can honestly say, have I ever yet seen them without thinking to myself what a joy they would afford to the gunners of the enemy! With smokeless powder, however, there is not the smallest doubt, that the machine guns of the defence should be able to fire upon the attacking infantry, up to the very last, without attracting the attention of the opposing artillery, whilst, although I do not think they will even take an active part in the actual assault of a position, yet I do believe that machine guns might very effectually find employment as a substitute for the third line of our attack formation. The functions of this third line are to fire volleys at the retreating enemy, a task which they would never arrive in time to execute; or to cover the retreat of the first and second lines, a contingency which it were better perhaps not to speculate upon. In either case, however, machine guns would do the work better, and would release a large number of men for the decisive fighting in the front. I fear, however, I am wandering from my subject, and I must hark back to Mr. Maxim's works, where the cordite which had been used on the occasion previously alluded to had not been altogether a success. Doubtless the explosive was not at that time quite perfected, but frequently, so I was informed, a large proportion of the charge would be blown out of the muzzle unconsumed, whereby the recoil became insufficient to work the mechanism of the gun. The powder I saw fired was compounded by Mr. Maxim. I regret to say I cannot give you its components, but as a commentary upon the praise the Director General of Ordnance has just accorded to Continental Governments, I should like to tell you for what it is worth, a story I have heard as to how these components first suggested themselves to the inventor. In 1889 the French Government were anxious to ascertain if the maxim would give good results when worked with their new explosive. Accordingly, they directed Mr. Maxim to bring over a gun of their rifle calibre for trial. When he arrived upon the ground, he found that the most extraordinary precautions had been taken to prevent his approaching either the belts of French cartridges or even the breech of his own gun. But Mr. Maxim is a difficult gentleman to beat, and the story goes, that he placed himself slightly in advance and to leeward of its muzzle.

Then, when the firing began, he snuffed up the fumes and so to speak analyzed them in his nostrils; and when the firing had concluded, he hurried off and subjected his clothes to a further careful chemical analysis. After this he is reported to have remained in deep meditation for several days, until, suddenly, while travelling in a railway carriage, he dashed his hat upon the floor of the compartment, exclaiming "I have it!" Whether he had got a service powder or not is a point upon which the lecturer will perhaps kindly give us his opinion. Possibly the powder may not be stable, but at any rate it was uncommonly effective on the occasion when I was fortunate enough to see it tried.

MAJOR SCOTT:—General COLLEN has asked two questions.—The first question is, what would be the possible effect of subjecting cordite cartridges to other climatic conditions, such as great damp at high temperatures, or at great elevations. I can only say that damp affects it so little, that the very safest way of storing it would be to keep it in a large tank of water, and after drying it would be just as fit as ever for use. With regard to the second question, *viz.*, as to the weight of the cordite cartridge, I would remark that the charge of cordite for the 12-pounder gun is 1 lb. 1½ oz., the charge of black powder being 4 lbs.; we see therefore that the former has a great advantage in respect to weight. Colonel HAMILTON mentioned having witnessed some experiments carried out with the maxim powder in the maxim machine guns. I also had an opportunity of seeing this powder fired when in England some two years ago, and there was not a single hitch with it. I was, however, led to understand that there were two objections to it, one was, that although the velocities obtained with it were very good, the pressures were high, and secondly, it was not a very stable powder."

The Chairman: Ladies and Gentlemen,—I am sure you will all wish me to express our thanks to Major Scott for his most interesting lecture, and I think you will also wish to express a feeling of regret at his approaching departure, and to hope, that rather than go to the India Office, he would remain at Ishapore.

The proceedings terminated with a vote of thanks to the chair, proposed by the Hon'ble General Brackenbury.

At Bangalore on May 13th 1891.

"GENERAL ZIETHEN'S DEFENCE OF THE LINE OF THE SAMBRE IN 1815."

By Brigadier-General G. Bengough, C. B.

Gentlemen,—It may be asked why I have selected as a tactical study the campaign of 1815, which some may say represents old fashioned tactics. It is partly for this reason that I have selected it. It used to form the first course of study in military history at the Staff College, and though the story is an old one, the principles of strategy and tactics set forth in it are, as are all principles, eternal. It was conducted by the greatest masters of war known, and strangely enough, though the outcome of past masters in the art of war, it comprises a large number of what must be regarded as serious errors. I propose to refer to some of these later on.

And now having cleared the ground, we will proceed to consider the actual operations which we are here to discuss. It is the action of a " Retarding Force," that is a force directed to check an enemy for a certain time for a certain purpose, and its duties are perhaps more familiar to us under the name of a rear guard. General Hamley in his " operations of war " points out, that if two forces, one inferior to the other, are opposed in an open plain, the weaker force must infallibly be beaten, but if the country possesses varied natural features, and if, as is probable in a campaign, one opponent knows little accurately of the strength of the other, the cases become very different, a reconnaissance of the enemy in position becomes necessary, and if one side elects to attack, line of battle must be formed by the other from column of route. All this takes time, and the manœuvre may be repeated; and thus a force may be almost indefinitely delayed according to the skill of the opposing commander.

Ziethen's defence of the line of the Sambre has been selected by General Hamley as an illustration of the action of a retarding force; but before we enter on a detailed examination of the manner in which he performed this duty, it will be well if we glance briefly at the positions occupied by the respective forces at the commencement of the campaign.

In June 1815 Napoleon found himself, as you remember, once again at the head of a French army. He was compelled by all considerations, both political and military, to take the initiative. Of his many enemies, the forces most immediately threatening Paris, and therefore himself, were those of the British and Prussian Allies in Belgium. These had formed on an extended front covering Brussels. The British who formed the right lay on a line reaching from Ath to Nivelles, and were

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based partly on Ostend and partly on Antwerp. The Prussians continued the line eastward to Liège, their base being at Cologne, and their several corps posted as under: Head-Quarters and Pirch's corps at Namur, Thielmann's corps at Ciney, Bülow's corps at Liège, Ziethen's corps on the Sambre.

It is evident that the usual three courses were open to Napoleon from which to select his line of attack. He might attack the allied left through the difficult country lying in the valleys of the Meuse and Sambre, which would have the effect of throwing back Blucher on Wellington; he might march on the centre, aiming directly at Brussels, and with the intention of cutting the allied line in two; or he might advance against Wellington's right, cutting him off from his base at Ostend, and threatening Brussels. We all know that he elected the second of these courses. The respective strategical advantages of these three lines of attack have been much debated. Napoleon's special pleaders, of whom there are many who cannot allow that their idol could do anything wrong, have strongly supported him in the course he followed; but it seems to me, and in this opinion I have the support of the Great Duke himself, that considerable advantage lay with an attack on Wellington's right. It is no doubt clear, as General Hamley has pointed out, that the first effect of this attack would be to throw back Wellington on the Prussians. But what would be the result of this? Would it not be to uncover Brussels, and thus give Napoleon at least a great initial advantage; Again, for the Prussian left flank to come to the support of the British would necessitate a march of some forty or fifty miles, and lastly, by advancing by his left Napoleon would have avoided the difficulties and dangers of passing a river in the face of an enemy. But these are matters outside the sphere of our considerations for this morning. We will proceed to examine how Ziethen carried out the delicate and important duty entrusted to him. His brigades were disposed as under. First brigade at Fontaine L'Evêque, second brigade at Marchienne on the Sambre, both these brigades having their outposts pushed well to the front. The third brigade was in reserve at Fleurus, and the fourth brigade at Monstier-sur-Sambre. The cavalry reserve was at Gosselies. The whole command had orders to retire gradually on Fleurus, the second brigade holding the bridges over the Sambre. Strange to say, no directions were given, or provision made, for the destruction of these bridges when they could no longer be held. The outposts of the second brigade at Thuin were driven in by the French about four A. M., on the 15th of June, and the French column (Reille) pressed on to the bridge at Marchienne, which they found defended by a weak rear guard of one battalion and two guns. The bridge was carried at about ten A. M., and the Prussian battalion driven back on its support at Dampremy, consisting of half a battalion and four guns. This small force was soon brushed aside, and the column pushed on to join, as directed, the centre column.

We will return for a minute to follow the progress of the other two French columns. They had assembled on the night of the 14th of June, the centre column (Vandamme), 64,000 men, with whom was Napoleon himself, at Beaumont, and the right column (Gerard), 16,000 men, at Philippeville, but this latter corps was not complete in numbers until the morning of the 15th. Napoleon had issued stringent orders that the concentration should be effected as secretly as possible, and that the camp fires should be hidden below high ground, but the Prussian outposts were not deceived by these artifices, and noticing the reflection of the fires in the air, reported the presence of large numbers of troops at Philippeville and Beaumont as early as the night of the 13th.

Napoleons's orders for the advance on the 15th were as usual very minute and voluminous. In this respect he and Wellington were alike; they delighted to detail the exact duties to be performed by every one under their command, but as is usual in such cases many of these orders were neglected or ignored.

The Duc de Fezensac in his very interesting "Souvenirs Militaires" gives many instances of this, and in reference to this occasion he says, that if the French soldier got his four lbs. of biscuit and four lbs. of rice as ordered, it was as much as could be expected. The three French corps were directed to advance at 3 A. M. on the 15th, but the only corps that actually did so was that of Reille, whose movements we have already followed. In the centre corps, Vandamme's divisions lay at some distance to the front, and the order to march apparently never reached him. The first intimation that he received of the movement of the column, was the head of the next corps pressing on his rear. An officer had been sent with orders for the march, but he is said to have fallen en route, at any rate he never delivered his message. This delayed the advance of the column for two hours, so that it did not arrive at Charleroi until 12 noon, a delay which much annoyed Napoleon, and which he describes as a "*funeste contretemps.*"

Pajol's cavalry had preceded this column, and found the bridge and village of Charleroi defended by a Prussian battalion. The horsemen were unable to force a passage, until reinforced by the Sappers of the Guard, or, as some say, by Napoleon himself at the head of the Young Guard.

The right column (Gerard) was also unfortunate in its movements. It received orders, but contradictory ones. It was at first directed to march on Charleroi by the direct road from Philippeville. It had not proceeded far, when the general commanding the leading division (General Bourmont) deserted. This was reported to Napoleon, and contributed to the delay of the centre column already mentioned. The right column was then ordered to march on Châtelet, and cross the Sambre there. Although this village was not defended by the Prussians, the crossing was not effected that evening, and so this right column may be left out of our considerations as far as regards the events of the 15th.

We have seen that the French centre column had occupied Charleroi by 12 noon, and that at 11 A. M. Reille's column was pushing on to join it from Marchienne, and at the same time was pressing the rear guard of Ziethen's 2nd brigade. This placed his 1st brigade in a somewhat critical position.

It was falling back, having collected its outposts, to join Ziethen, as ordered, at Fleurus. That general, hearing of the danger to his 1st brigade of being cut off by the now fast approaching French column, despatched a regiment of cavalry and one of infantry to its assistance to Gosselies. The Prussian cavalry met and defeated the cavalry advanced guard of the French, and permitted the 1st brigade to pass through Gosselies in safety. Being hard pressed by the French, now reinforced by three divisions from Reille's corps, the Prussian brigade turned on their enemy at Heppignies, and drove the head of their column back on Gosselies.

The 2nd Prussian brigade, after its rather weak defence of the passages of the Sambre, retired also on Fleurus, closely pressed by the main body of the French. At 2 P. M. this brigade reached Gilly, and here formed in order of battle, its left being supported by a detachment of the 3rd brigade at Châtelet. Napoleon on arrival, being uncertain as to what strength opposed him, halted to reconnoitre. His dispositions for the attack were not completed until 6 P. M. The Prussians then retired, pursued by the French cavalry, from whom they suffered considerably, but were able again to show a front to the French about three miles further on, at Lambusart. Retreating again hence, this brigade eventually joined Zeithen's three other brigades at 11 o'clock at night between St. Amand and Ligny. Thus we see how these two brigades, numbering 8,000 men each, were able to retard two columns, one of 45,000 and the other of 64,000 men, so that from 12 noon till nightfall these latter were unable to advance more than four or five miles. Hence the reason that General Hamley has selected this military exploit as an example of what can be accomplished by a retarding force skilfully conducted.

And now to make the comparison with the result of our war game. We have not unfortunately, or at any rate I have been unable to obtain, any account of the tactical details of this operation, interesting though they would be, and I am able to tell you nothing accurately as to the character of the country over which the troops moved. In the war game the Commander of the Retarding Force, finding the strong position of Bricksbury Hill to hand to the south of the river, rightly, I think, decided to hold it. He did not make the mistake of not preparing for the destruction of his bridges as did Ziethen, although time prevented our seeing how their defence would be carried out. The attack followed very much the tactics of the French, the Commander concentrating his columns on Aldershot (Charleroi), though taking advantage of the salient bend formed by the canal, and favouring his crossing, which does not exist in its prototype the river Sambre.

I mentioned at the commencement of my discourse the errors committed during this campaign. I propose to refer to some of them briefly again, not in any carping spirit of fault-finding, but in the belief that the great masters whose grand conceptions we humbly study would be themselves glad that we should learn a lesson, even from their mistakes.

(1) I have already commented on what I believe to have been a strategical error of Napoleon in attacking the centre of the allied line, where concentration for the allies was easiest, instead by a flank where it would have been difficult. Napoleon's disposition was an ardent and

a sanguine one, and it may have been that he thought to crush the allies by a heavy right and left blow directed on their centre. Perhaps his "St. Helena Memoirs" may elucidate this point, but I have not been able to refer to them.

(2) The front occupied by the allies was unnecessarily extended, comprising a line of some 80 miles, thus making concentration at any given point a lengthy and delicate operation. The excuse put forward for this was the difficulty of supply, but surely in a fertile country like Belgium such an excuse cannot hold good, when the importance of being able to oppose an initial superiority to Napoleon's advance is considered.

(3) I have already noted the unreadiness of the 6th corps (Gerard) to participate in the general advance of the French on the morning of the 15th. There appears to be no sufficient reason why this corps should not have been massed at its place of rendezvous equally with the others on the 14th of June. Owing to its not being so, and to the contradictory orders issued as to the line of advance, this corps did not participate in any way in the fortunes of the French on the above day. In the centre column we see how the neglect to send an important order by a double messenger caused a serious delay in the advance by that column.

(4) I approach the next instance, namely the errors of our own great Captain, with due deference and with some hesitation; and yet it is clear, that if we remember that on the evening of the 15th of June a single brigade stood on the main road to Brussels to bar the advance of the French army, and that this brigade found itself there under the initiative of its own divisional commander (General Perponcher), and without the orders of the Commander-in-Chief, some explanation is evidently due.

Let us examine the facts. As early as the 13th of June the Prussian outposts had reported the presence of large bodies of French troops massing on the frontier, and at 4 A. M. on the 15th Ziethen despatched a messenger to Wellington at Brussels reporting that he was retiring eastwards before the main French army. This messenger, again a single one, did not reach Brussels, a distance of five and twenty miles, until three P. M. The only orders issued by Wellington on receiving this report was for the several divisions of the army to hold themselves in readiness for concentration. It was not until 10 P. M., as he was going to the historic ball at Brussels, that he issued orders for the troops to move. Can there be a doubt, that on receipt of the first report of the approach of the French army on the Charleroi line, Wellington should have himself proceeded at once to Genappe, where he would have been in a position to test personally the truth of the report, and make his dispositions accordingly. As a matter of fact, Wellington did not arrive at Quatre Bras until 11 A. M. on the 16th, by which time, except for Ney's unnecessary delay, the battle of Quatre Bras might have been fought by 17,000 Frenchmen against an unsupported, weak diyision of Dutch-Belgians.

(5) Lastly, let us consider what would have been the effect of a stiffer defence of the line of the Sambre than that made by Ziethen

That a stiffer defence was possible, we may gather from the fact that none of the bridge-heads appear to have been held by more than a battalion of infantry and a few guns. Had these bridges been thoroughly prepared for defence, held by a sufficient force, and destroyed on retirement, it seems highly probable that the French might have been prevented from crossing, at least until nightfall, and thus ample time would have been afforded for the Prussians and British to assemble at the fore-arranged points of rendezvous in the celebrated Fleurus triangle; and Napoleon would have found himself confronted by an army nearly equal to his own on one flank, and by another nearly equally formidable on the other.

Lieut.-Colonel Gambier, Royal Horse Artillery: One would think that any general detailed to observe an enemy crossing a river would in the first place establish himself in a position to defend the crossing; and would at least occupy the bridges in force. Ziethen had 10,000 troops under General Steinmetz at Gosselies only four miles from Charleroi. Possibly the Duke of Wellington's reason for remaining at Brussels was that he could not believe that Napoleon's main army was crossing the river at Charleroi; he must have taken it for granted that the only proper advance could have been on his right viâ Maubeuge, Mons, Ath; for by advancing as Napoleon did in the centre between two large armies, he ran the risk of having 120,000 Prussians on his right and 100,000 British on his left, and there is no doubt, that had these armies been concentrated, he would have had to fight them both, one on either flank; he escaped this by the slowness of the allies.

Captain Williams, Bangalore Rifle Volunteers: It seems to me that Ziethen should have retreated on Brussels. Ney on the 16th nearly forced his way through at Quatre Bras, and would have probably done so if D' Erlon had not been called off by the Emperor, and yet when he attacked he had 17,000 men and 38 guns to force 7,000 men and 16 guns, and if they were forced Brussels was open. Knowing that the English force was distributed to meet an attack on the allied right, it appears to me that Ziethen was leaving the centre dangerously open. Nor could the French get round his left flank by Sombref without having to make a large détour, with the fast arriving Prussians on their right flank. Therefore in my opinion he should have adhered to the plan of falling back on Brussels, as Blucher and Wellington did. I think that this is what should have been done in accordance with the principles of strategy. The choice was to uncover his communications or to uncover the centre of the army, the weak joint. He chose the latter. Wellington and Blucher, or rather Blucher by himself, had the same problem two days later, and chose the former, throwing Napoleon entirely out of his calculations.

Captain Jones, 3rd Light Cavalry: It seems to me that the success of the Prussians in retarding the French with a comparatively small force for so long a time could hardly have been possible, had the French reconnoitred properly. It struck me that they deployed their large force without knowing what was actually in front of them. As regards the line of advance of the French, it seems to me a dangerous undertaking to pass a defile in the presence of an enemy, with a view to engaging him beyond it, with the defile as the only line of retreat.

Major Bromfield, Assistant Adjutant General: Perhaps Ziethen's reason for not destroying the bridges over the Sambre was to enable the allies to advance over them should they require to do so.

Major Phayre, 2nd Yorkshire Regiment, asked which bank of the river Sambre was the highest.

Brigadier-General Bengough: I scarcely think that the parallel drawn by Captain Williams between Ziethen's retirement on the 15th and Blucher's retreat on the 17th holds good. Ziethen was detailed for a certain duty, namely to check the advance of the French until the concentration of the allies could be effected. He had no reason to think that that of the British would have been so tardily carried out, and so could hardly be held justified in departing from the orders received from his own commander. That the French, and indeed the allies also, were badly served by their cavalry in matters of reconnaissance is without doubt, and I am glad that a cavalry officer here should have brought this to notice. I fear that history will not support Major Bromfield in the excuse he offers for Ziethen's neglect to destroy the bridges; I do not think that even the Prussians have ever attempted to excuse it.

I regret very much that we have not, as I have already said, any definite account of the military features of the country operated over.

I propose on a future occasion to take some such similar example as we have to-day discussed from the Franco-Prussian war of 1870, and the American war of 1862-64.

At Secunderabad on June 26th 1891.

CAVALRY TACTICS.

By Captain E. E. M. Lawford,
1st Madras Lancers.

Part I.

The generally expressed opinion among officers of the German army, and indeed among officers of all armies, is that the next great war will begin with a fierce and long sustained cavalry battle. In anticipation therefore of this, all the great military powers of Europe now maintain, almost at war strength, enormous masses of cavalry, ready to take the field at a moment's notice. The Civil War in America, 1861-63, drew the attention of military men to the way in which cavalry should be used; for although the cavalry on both sides was made of raw material got together anyhow, and without training as we understand it, yet the work done by that cavalry astonished Europe, and set military men thinking.

The American cavalry may be said to have initiated cavalry raids on distant expeditions, made usually against the enemy's line of communications. The German cavalry of to-day is now being trained a good deal on these lines.

We all know that on war breaking out between two civilized powers, a cavalry screen or veil is at once thrown along the frontier, behind which mobilization takes place, and which covers the advance of the armies. We most of us remember too, how well this duty was done in the Franco-German war by the German cavalry, and what a miserable business the French cavalry made of it. These lessons have been learnt by all, and the opening of the next grand campaign will undoubtedly begin by cavalry actions.

The veil having been thrown over the armies, then from both opposing sides cavalry divisions will be pushed forward, miles in advance of the armies which are mobilizing behind them. It stands then to reason that these cavalry masses must meet sooner or later, and that the campaign will therefore open by cavalry actions on an enormous scale. This was the ruling idea in the autumn manœuvres of the 7th and 10th German army corps, the operations of which I will now briefly describe, and for which I am indebted to Mr. Geo. Saunders of the *Morning Post.*

"The manœuvres of last autumn began with cavalry operations on an extensive scale. The general idea of the first day's operations was, that the 10th army corps, then commanded by General von Caprivi, represented a Northern army, with its centre at Springe, the Emperor's Head-Quarters. It was supposed to have lost touch of a Southern army, and to be trying to discover its whereabouts. This operation was conducted under the Emperor's personal command. The first two days' manœuvres afforded the most brilliant of all military spectacles, a great display of cavalry; and the interest which they aroused was all the more intense, that most German tacticians saw in the events of these two days, what they believe will form the introduction to the great battles of the future, namely, a vast deployment of cavalry thrown forward to reconnoitre, and encountering the enemy's cavalry midway between the hostile positions. The troops which the Emperor, commanding the attacking or Northern force in person, deployed for the purpose of attack, consisted of the whole cavalry division of the 10th army corps, a portion of their mounted field artillery, and a detachment of pioneers. The Southern force actively engaged in the defence, was made up of similar contributions from the 7th army corps, with the addition of an infantry regiment, whose retreat the vast mass of the cavalry of the Southern force covered.

About 7-30 on the morning of September 16th, the Emperor learnt that his advanced guard had got touch of the enemy near some villages; and he commanded his whole force to advance with the greatest speed. When the Emperor's forces approached the villages, they were received by the enemy's artillery, which, acting from a commanding position, succeeded in checking their advance; but the Emperor's artillery immediately returned the fire, and for nearly an hour an exclusively artillery battle raged. Meanwhile, a combined brigade of Cuirassiers and Uhlans, which the Emperor had sent out to reconnoitre on the right flank, rejoined the main body; and the enemy, observing this addition of strength, withdrew from their position, strong as it was. And now followed the most remarkable portion of the manœuvres of the 16th September. It is difficult to say which movement was best executed, the orderly retreat of the Southern army, leaving detachments of cavalry to observe our advance, and so perfectly covering their withdrawal that our artillery could not touch them during the whole operation; or, on the other hand, the masterly way in which our forces were manœuvred. Our artillery protected by cavalry, was sent forward at a gallop in order to take the first chance of directing their fire upon the retreat, or upon new positions which the enemy might occupy.

Indeed so sooner was the enemy again visible on the heights than our guns came into action driving them on to their final withdrawal. Meanwhile, our main force had defiled out of the village in admirable style, which the difficult nature of the hilly ground and the trying defiles it contained, rendered all the more praiseworthy.

Our task had been accomplished. We were again in touch of the enemy, and had ascertained the line of position he would evidently adopt in case of a general engagement, although no actual encounter, except between artillery, had taken place. The whole day's proceedings formed the liveliest representation of what might with probability be expected to occur during the earliest stages of the next European war.

On the 17th September, cavalry operations were continued on a grander scale, for the Emperor led the combined cavalry divisions of the 7th and 10th army corps against a skeleton cavalry force retreating eastwards.

It was with the greatest difficulty that the spectators could follow the rapid advance of the Emperor's cavalry and the retreat of the skeleton force of the enemy, as the ground which was covered extended for 17 or 20 miles. Never in recent years have cavalry operations been conducted on so magnificent a scale.

The 18th September was entirely a cavalry action; the burden of the battle fell upon the horse, not as on the previous day, upon the artillery. It was a wild pursuit of cavalry by cavalry across an exceedingly difficult country."

The events of these two days were eminently significant, as showing the belief of some of the best tacticians in Europe, that a new era has dawned for cavalry, owing to the new cautious infantry tactics which forbid the near approach of hostile armies, in view of the deadly destructiveness of repeating rifles, and the treacherous fire where the smoke of the new powder is scarcely visible. Under these circumstances, the duty will more than ever fall upon the cavalry of skirmishing and reconnoitring, and this skirmishing, which was formerly merely the introduction to a battle, has now become a great battle in itself, involving a new development of cavalry tactics. It has continually happened at the dawn of new epochs in the art of modern war, such as have been inaugurated by inventions and improvements in weapons of precision, that numerous military critics have propounded afresh the theory that the importance of cavalry had become a thing of the past. At the outbreak of the American Civil War this theory was strongly urged, and the cavalry of the South, which subsequently achieved such brilliant results, was created from the most modest beginnings by General Stuart probably without any adequate anticipation of the great development to which it was destined, and the eminent part which it was to play in the history of the war.

With reference to this arm, there is probably no experience so instructive as that of the American Civil War, and there is certainly none that is more eagerly studied and appreciated in Germany.

The story of Stuart's achievements serves to show what an advantage can be conferred upon forces which may be handicapped in other respects, if they possess a thoroughly disciplined and adequate body of cavalry, capable of acting both on the offensive and as a corps of observation. It has often been said that cavalry forms the eyes and feelers of an army, and cavalry alone can make it possible for those who are responsible for the conduct of military operations to penetrate the intentions of the enemy, and to choose both method and locality of attack on the ground of adequate knowledge.

But it is eminently true that cavalry not only constitutes the organs of sight for an army, but that it is also the instrument by which the enemy can be rendered blind. A successful attack on a large scale by cavalry breaks to pieces the network of observation which stretches in front of the position of the enemy in the shape of his outposts and patrols. A cavalry manœuvre like that of the 17th and 18th September at the last German manœuvres, would have resulted in the outposts of the enemy being simply ridden down, and this operation is capable of being conducted with practical safety for the attacking force, which advances no further than is necessary to destroy the enemy's feelers, or to compel him to develop his position. If the first of these tasks be accomplished, the enemy is for the time being practically blinded; if the other be achieved, the veil which shrouds his position is broken through, and the greatest advantage is secured in point of supeperior information in view of a general engagement.

So far as inferences were drawn from the autumn manœuvres of 1889, they all tended to show that the practice of reconnaissance by cavalry in force, will in future European warfare obtain much more extended application than in the past. All that can be done by small bodies of cavalry acting against such a network of advanced posts as covers the defence of a modern army, is to drive in a few outposts and frighten a few sentries. The reconnoitring parties will, as often as not, return very little the wiser for their expedition, and will have left the enemy without any serious injury to his own means of observation, or to the veil by which he covers his position and plans.

The attack in mass, on the other hand, constitutes in itself an operation of serious, and it may be, momentous importance, and it possesses the great advantage of being capable of execution without involving to the attacking party risks at all proportionate to the objects which may be secured in the event of success.

Now it is evident, that these attacks in mass must be met by opposing cavalry masses. As a practical illustration of this, I may mention that until very lately, there have been two independent divisions of cavalry garrisoned on the eastern and western frontiers of Germany, to watch, and in case of war, to act against respectively, the Russian cavalry on the eastern frontier, and a French cavalry division, commanded by General de Gallifet, stationed at Chalons.

Captain von Widdern, of the German army, has given us a good sample programme of what the cavalry of an invading army should try and do. He says:—"In a future war the divisions of German cavalry would not wait tamely on the frontier, as in 1870, before commencing hostilities, until the corps d'armée had accomplished their deployment in rear. Knowing that the fortified places constructed in Alsace-Lorraine would be sufficient to protect the frontier, they would leave merely to a few regiments the task of forming a screen between these places, and would at once cross the frontier, and would invade the enemy's country with the great mass of available cavalry in many directions, with the object of harassing and disturbing the normal course of mobilization of troops in the enemy's country, and also of preventing the arming and provisioning of the fortresses and other strong points. They would put the railways and telegraphs *hors de service;* they would spread false intelligence by circulating news of the approach of hostile troops at points where no troops were really likely to appear, or by leaving purposely in suitable places false returns and papers, either manuscript or printed, in order to mislead the enemy's staff. They would carry off important persons such as guides &c., seize upon newspapers, telegrams, bankers' correspondence, in order to obtain trustworthy intelligence, and so on. This programme could not of course be carried out, until the enemy's cavalry had been mastered to a certain extent."

Now the command of these independent divisions of cavalry is a most important matter. We all know that cavalry without a really good leader is worthless, and that a perfect cavalry leader is a somewhat rare individual, who is not likely to get more efficient, as he gets older, after passing the prime of life. The idea now in Germany is to give command of these divisions to specially selected officers, irrespective of their seniority and of age, to a certain extent, who may be thought by the authorities to be the right men for the work. Just as Stanley was appointed to rescue Emin Pacha, and just as Gordon was thought to be the right man to send to Khartoum, so would a cavalry officer be appointed in time of war to an independent command of cavalry, to carry out some given operation.

It has been laid down that:—"The success of cavalry in battle depends on the efficiency of its leader, and on the moral condition of the arm, as well as on its opportunities; naturally even an efficient leader will not be able to do much with a cavalry which is not up to the necessary tactical requirements of the day."

A German officer has thus described what is wanted in a cavalry leader. He says, that in addition to frankness and cunning, "we require the cavalry officer to have the most heterogeneous qualities: deliberation, daring cool calculation, calmness, endurance, perseverance, moving rapidly here there and everywhere. A cavalry man must sit in his saddle, and always be fresh, enterprising, and daring. Of course he must be thoroughly proficient in riding, otherwise the word cavalry would be out of place. Hand in hand with these characteristics must go those moral and equally important ones, which can be included in the expression, "grasp of the situation," in both a strategic and tactical sense. Further, the sharpness of the senses must be very highly developed, the sight and hearing must be capable of detecting the most minute occurrences, and all this must be enclosed in a constitution of iron. The cavalry man, as he sits in his saddle, is a free man, belonging entirely to his own head and heart; for him there should exist no situation, into which he cannot enter, or from which he cannot extricate himself, and to this end must he be trained."

Prince Kraft too thus speaks of the cavalry leader:—"The difficulties which trouble the mind of a general commanding cavalry are yet greater than those of a squadron commander, though of a slightly different character. The officer commanding a squadron can, even during a movement, interfere here and there, he can correct mistakes with his voice, and can exercise a personal influence. With a great mass of cavalry this is impossible. The officer commanding a cavalry division can do nothing, even by means of his aides-de-camp, when once the mass is in motion, and when their blood is once up. He must grasp the exact moment, and at that moment must give short but precise orders, for as soon as they have started in a swinging gallop, his influence is gone. He may see how here his orders have been misunderstood, or how there some unforeseen obstacle, or some precaution taken by the enemy, may render a change necessary, but he can do nothing. With a beating heart, and with heavy care, he is obliged to trust that his subordinates may do what is right of their own accord, while he has to bear all responsibility, whether victory or defeat be the result of his orders. How very much more comfortable is the officer commanding an infantry division! He can always send in time to such and such a battalion, or even to any company, if he sees that his orders or his intentions are not being carried out. The officer commanding a cavalry division has no such power. If he has not given his orders at once clearly, positively, and briefly, he will have no opportunity of explaining them afterwards. The commander of a large mass of cavalry must unite in his person so many extraordinary qualities, that no one who realises this, can wonder why it is that a Seydltz is seldom seen."

And again he writes:—" Picture to yourself the leader of a line as he gallops along; dust, and perhaps rain also, blinds his eyes; a long gallop has made him lose his breath; his horse has pecked as he jumped some ditch or hedge, and he has only just saved him from a fall; he arrives at the top of an undulation of the ground and sees the enemy galloping towards him; he has now at once to make up his mind what he will do and to give immediate orders. He has no time to think; even if he pulls up and gives his orders at the halt, his line is only 300 paces behind him, in half a minute it will be upon him, and even then his orders may be too late."

If you clearly put before yourselves the position which I have described above, it will be evident to you how much harder it is to lead a cavalry division or a cavalry brigade of a division, than it is to command an infantry division or an infantry brigade of a division; since, with the latter there is plenty of time for everything, and you can with your field-glass and your map in your hand quietly weigh the *pros* and *cons* and then give the needful orders.

What a number of qualities must a leader of cavalry possess, if he is to be really efficient at his work!

He must, first, be a good rider across country, better indeed than any of those under him. He must, moreover, be hard, so that neither exertions by day and night, nor the longest gallop, may affect him in the least. He must have the eye of an eagle, for he has no time to use his field-glass, which may probably be useless owing to the dust and rain. He must be a man of quick decision and of strong will, for he has no time for consideration or for counter orders. His position demands all these qualities, in addition to those which are expected from every officer of any arm. It is not sufficient that he is a skilled and practised leader of his own arm; he must have mastered strategy, and both the elementary and applied tactics of all arms.

PART II.

I have till now been considering only the rôle of cavalry when employed in detached masses. I will now shortly consider the duties of cavalry on the actual battle-field. Many people think that the day of cavalry on the battle-field has passed, owing to the murderous effect of the latest fire arms; as we have no experience ourselves, let us see what the Germans think of the matter.

Are they disbanding their cavalry, turning them into mounted infantry, or training them only to act as scouting masses, screening the advance of armies? No; we see the Germans laboriously training their cavalry to attack the three arms, and they consider that a cavalry charge, even against infantry armed with the breech-loader, is possible. They probably base their opinion on von Bredow's celebrated charge at Mars-la-Tour. Bredow's brigade consisted of two regiments, the 7th Cuirassiers, and the 16th Uhlans, but from these two regiments, two squadrons had been detached for reconnoitring duties, so that he only had six squadrons present. These six squadrons charged an army corps of the French. The first lines of the enemy were ridden down, the line of artillery broken through, and the cavalry swept through the whole of the hostile position, until, far in rear, it was met by closed bodies of French cavalry of overwhelming strength. It gave way before these, yet again swept through the enemy's lines, and rallied, terribly diminished in number, almost on the same spot from which it had started.

The German official narrative thus describes the charge:—

"It was only 2 P. M., the day was yet young; no infantry, and no reserves, and the nearest support a long way off. Now was the time to see what a self-sacrificing cavalry could do.

Bredow saw at a glance that the crisis demanded an energetic attack, in which the cavalry must charge home, and if necessary, should and must sacrifice itself. The 1st French line (breech-loaders and all) is ridden over; the line of guns is broken through; teams and gunners put to the sword. The 2nd line is powerless to check the vigorous charge of horses. The batteries on the heights further in rear limber up, and seek safety in flight. Eager to engage, and thirsting for victory, the Prussian squadrons charge even through the succeeding valley, they are met on all sides by French cavalry. Bredow sounds the re-call. Breathless from the long ride, thinned by the enemy's bullets, without reserves, and hemmed in by hostile cavalry, they have to fight their way back. After some hot mêlées with the enemy's horsemen, they once more cut their way through the previously over-ridden lines of cavalry and artillery, and harassed by a thick rain of bullets, and with the foe in rear, the remnant hastens back to Favigny . . . The bold attack had cost the regiments half their strength."

Now this charge has been very severely criticized. Let us consider the total loss and the consequences of the attack. The two cavalry regiments which advanced to this attack were less than 800 strong. They lost 363 men, 16 officers, and 409 horses. With this loss they saved an entire army corps; they checked the enemy's corps for the whole day; the French during that afternoon made no fresh advance from Rezonville.

This charge of 800 cavalry against 40,000 men was a magnificent business, better even than our own Balaclava charge, inasmuch as the results were so great.

During the progress of a battle the Cavalry Commander may have to carry out one or other of the following duties:—

1. To endeavour to gain the flanks or even the rear of the enemy with the horse artillery batteries attached to the cavalry, in order to make a diversion.

2. To aid and support every manœuvre which has for its object the outflanking of the enemy's line.

3. To oppose any similar manœuvre of the enemy, or at any rate, to give notice of and retard it, to the utmost of his power.

4. To oppose resolutely every offensive movement of the enemy's cavalry.

5. To fill up provisionally any gaps which may be made in the line of battle.

6. Finally, to send out detachments in the directions from which the bodies of the enemy are expected to arrive on the field of battle, and to delay their onward march by all the means in his power.

If the enemy is victorious the cavalry must sacrifice itself, in order to gain time, and should do its best to retard by its charges the pursuit of the enemy.

If its own army is victorious the cavalry should vigorously take up the pursuit, should endeavour to gain the flank of the enemy's columns in retreat, and convert the retreat into a rout; and never lose touch of the enemy.

Now, to return to Bredow's charge. With this example before us, I ask you why is it that in our army we always under-estimate the value of cavalry? In camps of exercise and in the war game, whenever cavalry attacks unbroken infantry or artillery in position, it is an understood thing that the cavalry is put out of action.

On the 1st day's manœuvres at the last camp of exercise here, I was commanding my regiment; and I had been entrusted with the duty of covering the advance of the army. I had three squadrons of my own regiment with me, and immediately in rear of me was the 1st Cavalry Hyderabad Contingent, four squadrons strong. My reconnoitring patrols brought in word that the enemy was in front, the infantry entrenched and commanding the mouth of a gorge from which we had to debouch, and their artillery in position in rear. The flanks of the pass through which we were marching were impracticable for cavalry. My only way of getting out of the pass therefore, was to charge the infantry in my front; this I immediately determined on doing, and I sent back word to the Hyderabad Cavalry to tell them of my intended action, and asking them to support me. The squadrons were rapidly deployed, and the charge was delivered, the Hyderabad Cavalry supporting.

I shall never forget the fury with which I was received by the umpire on the enemy's side. If I had done him the gravest personal injury, he could not have been more upset. He told me that I had made a front attack on intact infantry, and that my attack had failed miserably, and he gave me to understand that he looked on me more or less as a dangerous lunatic. The result of a conference of umpires shortly after was, that my regiment and the contingent cavalry were put out of action for the day. The strength of the enemy on this occasion, to which I was immediately opposed, was, I believe, one battery of artillery, and three or four companies of infantry. Our cavalry consisted of seven squadrons; in fact we had one squadron more than von Bredow had with him at Mars-la-Tour!

Now hear what Prince Kraft says on this subject:—

"It is of the greatest importance that the whole of the cavalry shall every year take part in joint manœuvres with the infantry, inasmuch as they can thus practise their service in reconnoitring and screening with reference to a real object, and in order that they may have, as often as possible, an opportunity of making an attack on infantry and artillery. Otherwise, owing to the constantly increasing cry as to the destructive effect of long-range fire, there is some danger that the cavalry will learn to consider each and every attack on the other arms as impossible, and will simply endeavour to get out of the reach of fire, as soon as either of them comes in sight. Let no one imagine that our Prussian pluck will save us from this. As the troops are taught in peace, so will they act in war, at least at first; and no one can deny the importance of the issue of the first battles in a war. It was the case that in former days the artillery were always ordered at manœuvres to retire, as soon as they came under infantry fire; it thus became an accepted principle that they were to do so. For example, a battery once retired in war with the excuse that it was under infantry fire; as a matter of fact a sheep, which they meant to kill at their bivouac, had been shot by a stray infantry bullet. Besides, at the manœuvres, the cavalry are often very hardly used by the umpires, however fortunate they may be in other respects. If each and every charge of cavalry or infantry is declared to be repulsed, if they are always made to fall back whenever they simply hear the fire of infantry or artillery, cavalry must learn to dislike allowing themselves to be seen.

Supposing that some cavalry have made a bold and well executed charge perhaps over hedges and ditches, and have fallen in the closest possible order upon some infantry, and find themselves put out of action, because they attacked unbroken infantry (and at manœuvres all infantry are naturally unbroken), have we any right to blame their leader if he loses all desire to charge infantry, since he will thus make himself ridiculous in the eyes of the onlookers, and will, moreover, wound the proper pride of his men?"

Now, Bredow's attack was not a surprise altogether. True, the French could not see it during the whole of the advance, owing to depressions in the ground, but we read that they saw the high rising dust which continually came nearer and nearer, and they knew that something unusual was up, and so made their preparations. The French infantry too was fairly fresh, intact, and secure on one flank. Thus the cavalry attacked under conditions, which, in camp of exercise manœuvres, would always be considered hopeless.

Von Bredow himself evidently took a similar view of the attack, as he spoke of sacrificing his cavalry, evidently not anticipating the effect which was actually produced.

The cavalry was sacrificed to a certain extent, at least half of the men and horses which went into action were left on the field: but what about infantry attacks?

Major Swaine told us last month of the losses sustained by the Prussian Guard at St. Privat, which were proportionately quite as severe as those of the cavalry at Mars-la-Tour. The result of this infantry attack was apparently *nil*, in fact, from a tactical point of view, it was a defect. I have already stated what was the immediate result of von Bredow's attack.

In this case the cavalry was used in accordance with true tactical principles. It was present at the right place, at the crisis of the fight, it was well handled by a good leader, and it gained a splendid success against intact and victorious infantry, armed with breech-loaders, and against artillery in position.

Remember, this charge was made by six squadrons in line without a second supporting line, and without reserves. What would have been the result if von Bredow had had all these? There were large bodies of German cavalry on the field, but they were far away, and could not be used at the critical moment. However, this action shows what cavalry can do, if ordered to sacrifice itself, as is sometimes necessary.

At that sime cavalry had hardly any idea of the tactics of the three lines. General Schmidt had not then propounded his principles of cavalry attack and manœuvre. Cavalry division drill was seldom practised, the leaders were without training in manœuvring large masses of cavalry, the movements were far slower than they now are, and the manœuvring power of cavalry was less.

The lesson we learn then from this is, that "cavalry must be trained to the highest possible degree of speed and manœuvring power, for it is only by surprise that it has attacked with decisive effect, and by this it will meet with its successes in the future."

Further, as this example teaches us, cavalry also has opportunities of carefully reconnoitring the ground during the exhausting infantry fight, which keeps swaying to and fro for so long over the same points, and so in that way it finds a means of coming up comparatively screened. Why should not other cavalry generals carry out successfully what General Bredow accomplished so well, that his brigade leading deserves to be put on a level with Seydlitz's approach at Rosbach? This manœuvring skill in the field gives us hope, for Bredow would have been able to send twenty-four squadrons forward, if he had possessed them at hand, just as well as the six which he led against the enemy. Thus, cavalry should always look out for some district, in which it can learn to make use of ground for covering its approach.

The German army owes much to the spirit of devotion shown by its cavalry at Mars-la-Tour. It saved them from a defeat, and the battle fully deserves the name of a cavalry battle. Cavalry opened it, and cavalry carried the other arms safely through the crises of the battle in twelve more or less tough engagements. It was the cavalry too, which wound up the battle, and was still charging down on the enemy's masses in the evening darkness, and it was this arm whose triumph it was to hear, as its final reward of victory, the despairing cry of the French infantry, "*Sauve qui peut*"!

PART III.

The great condition for the tactical success of cavalry, and one which can never be neglected with impunity, is its adaptability to manoeuvres of every kind. In the older days, when armies were comparatively small, the execution of manoeuvres was much simpler, fire-arms too did not then force cavalry to keep so far back as now.

If, on the one hand, repeating rifles compel cavalry in open country to remain in more retired positions, from which to come into action, on the other hand fairly large bodies of cavalry may now be brought up comparatively near to the fighting line, owing to cover obtained from hedges and cultivation &c Further, the murderous infantry fight lasts so long, and remains for many hours so stationary about the decisive points, that cavalry might keep for many hours in one position, without being exposed to any danger, as happened at Gravelotte. This is a decided advantage of modern fighting for the tactical action of cavalry.

In the fights of the last century, infantry was never so morally broken, as it is in the present day, after a serious action. In fact infantry was then never charged except when it could be surprised or taken in flank, as at Rosbach. Infantry is now far more exposed to the decomposing power of fire-action, and the very circumstance that the actual duration of a fight is attended with great physical exertion, must, in comparison with former times, turn the scale in favour of cavalry.

A man has pretty well used up all his strength after marching under arms for eight or ten hours in a scorching heat; and he is practically exhausted both in mind and body, if he has been engaged in a fluctuating fight for six or eight hours; if his nerves have had to stand the roar of the firing for so long; if he himself has, all this time, had no opportunity of refreshing himself, of recovering his breath, or of having a moment's peace during all these hours.

Now, it is true that the material and moral loss of the attacking or defending infantry is not the same along the whole line; there must always be places in which the infantry gets completely worn out, and it is here that the cavalry's most favourable field lies. Infantry will naturally suffer the greatest material and moral losses in attacks or forward movements over open ground, as happened, for instance, to the Guards at St. Privat, and this is the opportunity for cavalry coming into action in masses.

If critics would only learn how infantry is consumed by fire-action, and into what an exhausted state infantry then falls, it is quite certain that the saying, "The action of cavalry on the battle-field is a superfluity," would never have been tolerated.

The distinguished German cavalry officer, from whose experience I have largely drawn says :—

"Personally, I have not seen many cavalry attacks, but those which I have seen have strengthened me in the belief, that the action of cavalry in battle can be crowned with great successes, if, as the result of organization, training, and good commanders, the arm feels that it can say : I will risk it, and I will do it.

I have also seen infantry which was quite played out ; one squadron would then have been enough to ride down and settle the remnants of a whole brigade, while a whole division could, without difficulty, have ridden right up to the position of the Commander-in-Chief, and might perhaps have decided the battle on this flank."

Napoleon made it a rule to bring up his cavalry to that point where he wished to bring about a decision,

1. Either to prepare to victory.
2. To prevent the enemy driving him back.
3. To bring it into action for the decision.
4. To have it at his disposal for the decision of the battle.

If Napoleon decided to break the enemy's centre, he kept his cavalry massed opposite that point; if he decided on a turning movement, he posted his cavalry opposite the flank that he intended turning.

The tactical motives for these dispositions were the outcome of his strategical object.

Now, if we look at modern battle-fields, it would appear that the posting of cavalry masses is often done without any special idea. The cavalry is told to follow the other troops, because no one seems to know what to do with it, and it is quite unusual to allow the Cavalry Commander himself to choose a suitable position. Wherever we look, we find that the position of the cavalry did not correspond with the tactical situation. In order that the cavalry divisions may be at the right places during the battle, they must know their places beforehand, and their action must be the prelude of the battle. They must forcibly get touch of the whole line, obtain a thorough knowledge of it, and report their observations to the Commander-in-Chief, who would then be able to tell the cavalry off to positions, from which its action can assist the tactical object.

We should remember that battle-fields are not rifle ranges, but a confused mass of heights and valleys, of fields and ravines, of woods and villages &c., which give to each arm a field for its action, provided of course that the arm is capable of manœuvring in such country.

Moreover, a battle-field is the scene of many mistakes, which a tactician can turn to his advantage.

I know that the magazine rifle is brought forward by the opponents of cavalry as a further argument for running down cavalry and its importance in battle. But even repeating rifles will not do away with cavalry. Every battle-field affords opportunities of taking up positions, and advancing more or less under cover, and of manœuvring.

Every battle-field also shows now, just as formerly, the inevitable consequences of a stubborn fight, be they disorder, confusion, and the consequent tactical errors, or want of watchfulness; or be they the fact that the power of the infantry has sunk into complete apathy in consequence of the physically and mentally wearing effect of a long continued fire-action. The moment will come in the future, as it did in the past, when one of the opponents must give way, and this is always the time when the cavalry should win its laurels at small cost, provided it follows up the progress of the battle, so as to be in the right place at the decisive moment, and provided masses of cavalry charge into the disordered enemy. This is for the leader to see to, and the cavalry would find nothing to check it, unless the enemy were able to bring up his reserves.

A modern battle is, certainly, mainly a fire-action, and the fact that this action clings to the same line for hours, of itself causes the troops to fall into confusion. At the end of an hour or so, the majority of the officers are either killed or *hors-de-combat*, and the troops themselves are left to their own individual resources. They fight on and on in their bloody duty, they wait and hold out to their last breath.

Meanwhile, the gaps are continually being filled up from the rear, the fighting line has become a confused medley of formations and troops, and this confusion is most marked at the decisive points; here it is that the waste of strength and the disorder are greatest on both sides, and that most of the commanders are missing.

Accordingly, a mass of cavalry should, as soon as possible, be directed there, in readiness to dash forward the moment that the enemy gives way, and the confused remnants, breathless and exhausted, begin to retreat.

At this moment, it is quite a matter of indifference whether these remnants carry a repeating rifle, a flint musket, or a pitch-fork, for the men's nerves are overstrained, and their weapon counts for nothing.

This moment, certainly, does not last for ever. A few minutes suffice to get these remnants out of the zone of their enemy's fire, and for them gradually to recover their breath, and to get fresh life; a new allowance of strength returns, and once more re-instates the murderous weapon—for a time useless—in its terrible power.

If the cavalry allows the enemy to make use of these few minutes, it deserves to be dismissed from the battle-field with disgrace and ignominity, but, if it makes use of this time, it is doing no more than its duty, and does so, unquestionably, at no great sacrifice. This picture of a defeated infantry is drawn by a German officer from facts, and he says it applies to all armies. It is his conviction, based on war experience, that cavalry, provided it instantly seizes on the moment of the enemy's discomfiture, can dash right up to his artillery positions and turn infantry and artillery into one confused mass.

With older tactics this was not possible to anything like so great an extent, for the rout of the defeated enemy never reached such a pitch as it does now; his moral strength never got so low as it naturally must now, when the decision is fought out for so long; and the troops never lost such a number of leaders as they do now-a-days.

All that appears to me to be quite sound, and I can only account for the defeat of the French Cuirassiers at Worth on the ground that that the charge must have been delivered too late. Prince Kraft writes thus of the charge:—"On the one hand the Prussian cavalry made successful charges at Vionville; but on the other, the charges of the French Cuirassiers at Worth against the Prussian infantry failed altogether.

An infantry officer who was present told me (i. e. Prince Kraft), with regard to a cavalry charge at Worth, that, at the moment our infantry were falling back down a slope from an attack which had failed, a hail of chassepot and mitrailleuse bullets followed them, and every one felt that he would never reach the cover of the wood which lay below them. Tired to death, and resigned to their fate, the whole of the infantry were slowly crawling towards the wood. Suddenly the murderous fire ceased. Every one stopped, astonished to see what had saved them from the fate which seemed certain. Then they saw the French Cuirassiers, who, as they pushed forward, masked the fire of their own infantry and artillery.

These Cuirassiers appeared to them like guardian angels. With the most perfect calm, every man halted on the spot where he stood, and fired at the Cuirassiers, who were soon swept away by the rapid fire.

With regard to the charge of the French cavalry on the Prussian infantry at Vionville, I was told by an eye-witness, who, as he commanded a regiment, had trotted up to the support of the infantry who were charged, but found that his assistance was not needed, and who had thus the opportunity of closely observing the contest, that he noticed to his great delight how bravely his comrades of the infantry stood their ground, and how scarcely any of them were ridden down; but that, as a cavalry man, his heart bled at the sight of the absolute powerlessness of the brave French cavalry against the calm and stubborn infantry, who did not even form square, but remained in the formation in which they happened to be, and quietly poured in their fire.

The French Cuirassiers of the Guard, well equipped and capitally led, charged in excellent order, and with the greatest possible exactness and courage. But their splendid horses fell in masses under the well-aimed fire. The centre of the line of the Cuirassiers, which went straight at the infantry, was annihilated. Then the two wings swung away from each other, were fired on as they passed by the battalion, and then ran the gauntlet of the skirmishers and supports. Thus in a few minutes nothing remained of this magnificent regiment of cavalry but a few scattered troopers, who had scarcely succeeded in cutting down a single infantry soldier."

If we sum up the experience which has been gained, we may say that successful charges of cavalry on infantry on a large and on a small scale, have succeeded in the latest wars, and may still be successful, even when the cavalry is inferior in number to the others. But as a rule, such charges can be crowned with victory, only when the enemy's infantry, owing to surprise, stress of battle, a mishap, or some other cause, has lost somewhat of their power of resistance.

A frontal charge against intact infantry will seldom succeed. The episodes in the battle of Custozza, where at Villafranca and Mongabia, cavalry obtained such astonishing success against intact infantry, must be explained by the fact, that this infantry, for some reason or other, had not the full value of intact troops. But, precisely because the attacking cavalry cannot be certain beforehand with regard to this point, the charge of cavalry against intact infantry ought not to be condemned in principle, and should certainly be commended, when the condition of the action is such, that the cavalry, even if it be sacrificed altogether, does such service to the whole army as is out of proportion to the loss which it suffers: for example, as at Mongabia and at Vionville.

We see, moreover, that cavalry charges, if they break out from the front of their own infantry and mask the fire of the latter, enable the infantry which is charged to gain time, owing to the cessation of this fire, to recover their formation; and that such attacks are thus, not only (as at Worth) without result, but are even of advantage to the enemy's infantry.

They have on the other hand greater chance of success, when they start so far on the flank of their own infantry (Bredow at Vionville), that the infantry and artillery can continue to fire up to the moment of onslaught, and can thus do their utmost to increase the destruction of the enemy's infantry.

Cavalry should therefore always endeavour, when they propose to join in a contest carried on by the other arms, to start from the flank of their own fighting line and to charge the flank of the enemy's line, and thus to give as much opportunity as possible for the fire of their own troops to take effect.

PART IV.

I will not now weary you by explaining in detail the drill book formations and evolutions of cavalry, but I will simply go through the board principles of the three-line formation. Most of you probably know already, that the three-line formation, taken from the German cavalry drill book, is the method in vogue in our army, and in all European armies, for manœuvring and fighting.

In the last camp of exercise the cavalry division, under General Luck, was formed of six regiments of cavalry. These were again formed into three brigades of two regiments each, with one battery of horse artillery attached.

On arriving at the drill ground, "rendezvous" formation was taken up, that is, the brigades were formed in three lines, one behind the other, each regiment being in line of squadron column at close interval, dressing to the left.

On the attack being determined on, "preparatory formation" was taken up, *i. e.* the first brigade took deploying interval from the centre of the brigade, the line being still in squadron column formation. This formed the 1st line.

The 2nd and 3rd Brigades moved off to the right and left flanks, still keeping line of squadron column at close interval. These brigades the mass is in motion, and when their blood is once up. He must grasp the exact moment, and at that moment must give short but precise orders, for as soon as they have started in a swinging gallop, his influence is gone. He may see how here his orders have been misunderstood, or how there some unforeseen obstacle, or some precaution taken by the enemy, may render a change necessary, but he can do nothing. With a beating heart, and with heavy care, he is obliged to trust that his subordinates may do what is right of their own accord, while he has to bear all responsibility, whether victory or defeat be the result of his orders. How very much more comfortable is the officer commanding an infantry division! He can always send in time to such and such a battalion, or even to any company, if he sees that his orders or his intentions are not being carried out. The officer commanding a cavalry division has no such power. If he has not given his orders at once clearly, positively, and briefly, he will have no opportunity of explaining them afterwards. The commander of a large mass of cavalry must unite in his person so many extraordinary qualities, that no one who realises this, can wonder why it is that a Seydltz is seldom seen."

And again he writes:—"Picture to yourself the leader of a line as he gallops along; dust, and perhaps rain also, blinds his eyes; a long gallop has made him lose his breath; his horse has pecked as he jumped some ditch or hedge, and he has only just saved him from a fall; he arrives at the top of an undulation of the ground and sees the enemy galloping towards him; he has now at once to make up his mind what he will do and to give immediate orders. He has no time to think; even if he pulls up and gives his orders at the halt, his line is only 300 paces behind him, in half a minute it will be upon him, and even then his orders may be too late."

If you clearly put before yourselves the position which I have described above, it will be evident to you how much harder it is to lead a cavalry division or a cavalry brigade of a division, than it is to command an infantry division or an infantry brigade of a division; since, with the latter there is plenty of time for everything, and you can with your field-glass and your map in your hand quietly weigh the *pros* and *cons* and then give the needful orders.

What a number of qualities must a leader of cavalry possess, if he is to be really efficient at his work!

He must, first, be a good rider across country, better indeed than any of those under him. He must, moreover, be hard, so that neither exertions by day and night, nor the longest gallop, may affect him in the least. He must have the eye of an eagle, for he has no time to use his field-glass, which may probably be useless owing to the dust and rain. He must be a man of quick decision and of strong will, for he has no time for consideration or for counter orders. His position demands all these qualities, in addition to those which are expected from every officer of any arm. It is not sufficient that he is a skilled and practised leader of his own arm; he must have mastered strategy, and both the elementary and applied tactics of all arms.

PART II.

I have till now been considering only the rôle of cavalry when employed in detached masses. I will now shortly consider the duties of cavalry on the actual battle-field. Many people think that the day of cavalry on the battle-field has passed, owing to the murderous effect of the latest fire arms; as we have no experience ourselves, let us see what the Germans think of the matter.

Are they disbanding their cavalry, turning them into mounted infantry, or training them only to act as scouting masses, screening the advance of armies? No; we see the Germans laboriously training their cavalry to attack the three arms, and they consider that a cavalry charge, even against infantry armed with the breech-loader, is possible. They probably base their opinion on von Bredow's celebrated charge at Mars-la-Tour. Bredow's brigade consisted of two regiments, the 7th Cuirassiers, and the 16th Uhlans, but from these two regiments, two squadrons had been detached for reconnoitring duties, so that he only had six squadrons present. These six squadrons charged an army corps of the French. The first lines of the enemy were ridden down, the line of artillery broken through, and the cavalry swept through the whole of the hostile position, until, far in rear, it was met by closed bodies of French cavalry of overwhelming strength. It gave way before these, yet again swept through the enemy's lines, and rallied, terribly diminished in number, almost on the same spot from which it had started.

The German official narrative thus describes the charge:—

"It was only 2 P. M., the day was yet young; no infantry, and no reserves, and the nearest support a long way off. Now was the time to see what a self-sacrificing cavalry could do.

Bredow saw at a glance that the crisis demanded an energetic attack, in which the cavalry must charge home, and if necessary, should and must sacrifice itself. The 1st French line (breech-loaders and all) is ridden over; the line of guns is broken through; teams and gunners put to the sword. The 2nd line is powerless to check the vigorous charge of horses. The batteries on the heights further in rear limber up, and seek safety in flight. Eager to engage, and thirsting for victory, the Prussian squadrons charge even through the succeeding valley, they are met on all sides by French cavalry. Bredow sounds the re-call. Breathless from the long ride, thinned by the enemy's bullets, without reserves, and hemmed in by hostile cavalry, they have to fight their way back. After some hot mêlées with the enemy's horsemen, they once more cut their way through the previously over-ridden lines of cavalry and artillery, and harassed by a thick rain of bullets, and with the foe in rear, the remnant hastens back to Favigny . . . The bold attack had cost the regiments half their strength."

Now this charge has been very severely criticized. Let us consider the total loss and the consequences of the attack. The two cavalry regiments which advanced to this attack were less than 800 strong. They lost 363 men, 16 officers, and 409 horses. With this loss they saved an entire army corps; they checked the enemy's corps for the whole day; the French during that afternoon made no fresh advance from Rezonville.

This charge of 800 cavalry against 40,000 men was a magnificent business, better even than our own Balaclava charge, inasmuch as the results were so great.

During the progress of a battle the Cavalry Commander may have to carry out one or other of the following duties:—

1. To endeavour to gain the flanks or even the rear of the enemy with the horse artillery batteries attached to the cavalry, in order to make a diversion.

2. To aid and support every manœuvre which has for its object the outflanking of the enemy's line.

3. To oppose any similar manœuvre of the enemy, or at any rate, to give notice of and retard it, to the utmost of his power.

4. To oppose resolutely every offensive movement of the enemy's cavalry.

5. To fill up provisionally any gaps which may be made in the line of battle.

6. Finally, to send out detachments in the directions from which the bodies of the enemy are expected to arrive on the field of battle, and to delay their onward march by all the means in his power.

If the enemy is victorious the cavalry must sacrifice itself, in order to gain time, and should do its best to retard by its charges the pursuit of the enemy.

If its own army is victorious the cavalry should vigorously take up the pursuit, should endeavour to gain the flank of the enemy's columns in retreat, and convert the retreat into a rout; and never lose touch of the enemy.

Now, to return to Bredow's charge. With this example before us, I ask you why is it that in our army we always under-estimate the value of cavalry? In camps of exercise and in the war game, whenever cavalry attacks unbroken infantry or artillery in position, it is an understood thing that the cavalry is put out of action.

On the 1st day's manœuvres at the last camp of exercise here, I was commanding my regiment; and I had been entrusted with the duty of covering the advance of the army. I had three squadrons of my own regiment with me, and immediately in rear of me was the 1st Cavalry Hyderabad Contingent, four squadrons strong. My reconnoitring patrols brought in word that the enemy was in front, the infantry entrenched and commanding the mouth of a gorge from which we had to debouch, and their artillery in position in rear. The flanks of the pass through which we were marching were impracticable for cavalry. My only way of getting out of the pass therefore, was to charge the infantry in my front; this I immediately determined on doing, and I sent back word to the Hyderabad Cavalry to tell them of my intended action, and asking them to support me. The squadrons were rapidly deployed, and the charge was delivered, the Hyderabad Cavalry supporting.

I shall never forget the fury with which I was received by the umpire on the enemy's side. If I had done him the gravest personal injury, he could not have been more upset. He told me that I had made a front attack on intact infantry, and that my attack had failed miserably, and he gave me to understand that he looked on me more or less as a dangerous lunatic. The result of a conference of umpires shortly after was, that my regiment and the contingent cavalry were put out of action for the day. The strength of the enemy on this occasion, to which I was immediately opposed, was, I believe, one battery of artillery, and three or four companies of infantry. Our cavalry consisted of seven squadrons; in fact we had one squadron more than von Bredow had with him at Mars-la-Tour!

Now hear what Prince Kraft says on this subject:—

"It is of the greatest importance that the whole of the cavalry shall every year take part in joint manœuvres with the infantry, inasmuch as they can thus practise their service in reconnoitring and screening with reference to a real object, and in order that they may have, as often as possible, an opportunity of making an attack on infantry and artillery. Otherwise, owing to the constantly increasing cry as to the destructive effect of long-range fire, there is some danger that the cavalry will learn to consider each and every attack on the other arms as impossible, and will simply endeavour to get out of the reach of fire, as soon as either of them comes in sight. Let no one imagine that our Prussian pluck will save us from this. As the troops are taught in peace, so will they act in war, at least at first; and no one can deny the importance of the issue of the first battles in a war. It was the case that in former days the artillery were always ordered at manœuvres to retire, as soon as they came under infantry fire; it thus became an accepted principle that they were to do so. For example, a battery once retired in war with the excuse that it was under infantry fire; as a matter of fact a sheep, which they meant to kill at their bivouac, had been shot by a stray infantry bullet. Besides, at the manœuvres, the cavalry are often very hardly used by the umpires, however fortunate they may be in other respects. If each and every charge of cavalry or infantry is declared to be repulsed, if they are always made to fall back whenever they simply hear the fire of infantry or artillery, cavalry must learn to dislike allowing themselves to be seen.

Supposing that some cavalry have made a bold and well executed charge perhaps over hedges and ditches, and have fallen in the closest possible order upon some infantry, and find themselves put out of action, because they attacked unbroken infantry (and at manœuvres all infantry are naturally unbroken), have we any right to blame their leader if he loses all desire to charge infantry, since he will thus make himself ridiculous in the eyes of the onlookers, and will, moreover, wound the proper pride of his men?"

Now, Bredow's attack was not a surprise altogether. True, the French could not see it during the whole of the advance, owing to depressions in the ground, but we read that they saw the high rising dust which continually came nearer and nearer, and they knew that something unusual was up, and so made their preparations. The French infantry too was fairly fresh, intact, and secure on one flank. Thus the cavalry attacked under conditions, which, in camp of exercise manœuvres, would always be considered hopeless.

Von Bredow himself evidently took a similar view of the attack, as he spoke of sacrificing his cavalry, evidently not anticipating the effect which was actually produced.

The cavalry was sacrificed to a certain extent, at least half of the men and horses which went into action were left on the field: but what about infantry attacks?

Major Swaine told us last month of the losses sustained by the Prussian Guard at St. Privat, which were proportionately quite as severe as those of the cavalry at Mars-la-Tour. The result of this infantry attack was apparently *nil*, in fact, from a tactical point of view, it was a defect. I have already stated what was the immediate result of von Bredow's attack.

In this case the cavalry was used in accordance with true tactical principles. It was present at the right place, at the crisis of the fight, it was well handled by a good leader, and it gained a splendid success against intact and victorious infantry, armed with breech-loaders, and against artillery in position.

Remember, this charge was made by six squadrons in line without a second supporting line, and without reserves. What would have been the result if von Bredow had had all these? There were large bodies of German cavalry on the field, but they were far away, and could not be used at the critical moment. However, this action shows what cavalry can do, if ordered to sacrifice itself, as is sometimes necessary.

At that time cavalry had hardly any idea of the tactics of the three lines. General Schmidt had not then propounded his principles of cavalry attack and manœuvre. Cavalry division drill was seldom practised, the leaders were without training in manœuvring large masses of cavalry, the movements were far slower than they now are, and the manœuvring power of cavalry was less.

The lesson we learn then from this is, that "cavalry must be trained to the highest possible degree of speed and manœuvring power, for it is only by surprise that it has attacked with decisive effect, and by this it will meet with its successes in the future."

Further, as this example teaches us, cavalry also has opportunities of carefully reconnoitring the ground during the exhausting infantry fight, which keeps swaying to and fro for so long over the same points, and so in that way it finds a means of coming up comparatively screened. Why should not other cavalry generals carry out successfully what General Bredow accomplished so well, that his brigade leading deserves to be put on a level with Seydlitz's approach at Rosbach? This manœuvring skill in the field gives us hope, for Bredow would have been able to send twenty-four squadrons forward, if he had possessed them at hand, just as well as the six which he led against the enemy. Thus, cavalry should always look out for some district, in which it can learn to make use of ground for covering its approach.

The German army owes much to the spirit of devotion shown by its cavalry at Mars-la-Tour. It saved them from a defeat, and the battle fully deserves the name of a cavalry battle. Cavalry opened it, and cavalry carried the other arms safely through the crises of the battle in twelve more or less tough engagements. It was the cavalry too, which wound up the battle, and was still charging down on the enemy's masses in the evening darkness, and it was this arm whose triumph it was to hear, as its final reward of victory, the despairing cry of the French infantry, "*Sauve qui peut*"!

PART III.

The great condition for the tactical success of cavalry, and one which can never be neglected with impunity, is its adaptability to manœuvres of every kind. In the older days, when armies were comparatively small, the execution of manœuvres was much simpler, fire-arms too did not then force cavalry to keep so far back as now.

If, on the one hand, repeating rifles compel cavalry in open country to remain in more retired positions, from which to come into action, on the other hand fairly large bodies of cavalry may now be brought up comparatively near to the fighting line, owing to cover obtained from hedges and cultivation &c Further, the murderous infantry fight lasts so long, and remains for many hours so stationary about the decisive points, that cavalry might keep for many hours in one position, without being exposed to any danger, as happened at Gravelotte. This is a decided advantage of modern fighting for the tactical action of cavalry.

In the fights of the last century, infantry was never so morally broken, as it is in the present day, after a serious action. In fact infantry was then never charged except when it could be surprised or taken in flank, as at Rosbach. Infantry is now far more exposed to the decomposing power of fire-action, and the very circumstance that the actual duration of a fight is attended with great physical exertion, must, in comparison with former times, turn the scale in favour of cavalry.

A man has pretty well used up all his strength after marching under arms for eight or ten hours in a scorching heat; and he is practically exhausted both in mind and body, if he has been engaged in a fluctuating fight for six or eight hours; if his nerves have had to stand the roar of the firing for so long; if he himself has, all this time, had no opportunity of refreshing himself, of recovering his breath, or of having a moment's peace during all these hours.

Now, it is true that the material and moral loss of the attacking or defending infantry is not the same along the whole line; there must always be places in which the infantry gets completely worn out, and it is here that the cavalry's most favourable field lies. Infantry will naturally suffer the greatest material and moral losses in attacks or forward movements over open ground, as happened, for instance, to the Guards at St. Privat, and this is the opportunity for cavalry coming into action in masses.

If critics would only learn how infantry is consumed by fire-action, and into what an exhausted state infantry then falls, it is quite certain that the saying, "The action of cavalry on the battle-field is a superfluity," would never have been tolerated.

The distinguished German cavalry officer, from whose experience I have largely drawn says :—

"Personally, I have not seen many cavalry attacks, but those which I have seen have strengthened me in the belief, that the action of cavalry in battle can be crowned with great successes, if, as the result of organization, training, and good commanders, the arm feels that it can say : I will risk it, and I will do it.

I have also seen infantry which was quite played out ; one squadron would then have been enough to ride down and settle the remnants of a whole brigade, while a whole division could, without difficulty, have ridden right up to the position of the Commander-in-Chief, and might perhaps have decided the battle on this flank."

Napoleon made it a rule to bring up his cavalry to that point where he wished to bring about a decision,

1. Either to prepare to victory.
2. To prevent the enemy driving him back.
3. To bring it into action for the decision.
4. To have it at his disposal for the decision of the battle.

If Napoleon decided to break the enemy's centre, he kept his cavalry massed opposite that point ; if he decided on a turning movement, he posted his cavalry opposite the flank that he intended turning.

The tactical motives for these dispositions were the outcome of his strategical object.

Now, if we look at modern battle-fields, it would appear that the posting of cavalry masses is often done without any special idea. The cavalry is told to follow the other troops, because no one seems to know what to do with it, and it is quite unusual to allow the Cavalry Commander himself to choose a suitable position. Wherever we look, we find that the position of the cavalry did not correspond with the tactical situation. In order that the cavalry divisions may be at the right places during the battle, they must know their places beforehand, and their action must be the prelude of the battle. They must forcibly get touch of the whole line, obtain a thorough knowledge of it, and report their observations to the Commander-in-Chief, who would then be able to tell the cavalry off to positions, from which its action can assist the tactical object.

We should remember that battle-fields are not rifle ranges, but a confused mass of heights and valleys, of fields and ravines, of woods and villages &c., which give to each arm a field for its action, provided of course that the arm is capable of manœuvring in such country.

Moreover, a battle-field is the scene of many mistakes, which a tactician can turn to his advantage.

I know that the magazine rifle is brought forward by the opponents of cavalry as a further argument for running down cavalry and its importance in battle. But even repeating rifles will not do away with cavalry. Every battle-field affords opportunities of taking up positions, and advancing more or less under cover, and of manœuvring.

Every battle-field also shows now, just as formerly, the inevitable consequences of a stubborn fight, be they disorder, confusion, and the consequent tactical errors, or want of watchfulness; or be they the fact that the power of the infantry has sunk into complete apathy in consequence of the physically and mentally wearing effect of a long continued fire-action. The moment will come in the future, as it did in the past, when one of the opponents must give way, and this is always the time when the cavalry should win its laurels at small cost, provided it follows up the progress of the battle, so as to be in the right place at the decisive moment, and provided masses of cavalry charge into the disordered enemy. This is for the leader to see to, and the cavalry would find nothing to check it, unless the enemy were able to bring up his reserves.

A modern battle is, certainly, mainly a fire-action, and the fact that this action clings to the same line for hours, of itself causes the troops to fall into confusion. At the end of an hour or so, the majority of the officers are either killed or *hors-de-combat*, and the troops themselves are left to their own individual resources. They fight on and on in their bloody duty, they wait and hold out to their last breath.

Meanwhile, the gaps are continually being filled up from the rear, the fighting line has become a confused medley of formations and troops, and this confusion is most marked at the decisive points; here it is that the waste of strength and the disorder are greatest on both sides, and that most of the commanders are missing.

Accordingly, a mass of cavalry should, as soon as possible, be directed there, in readiness to dash forward the moment that the enemy gives way, and the confused remnants, breathless and exhausted, begin to retreat.

At this moment, it is quite a matter of indifference whether these remnants carry a repeating rifle, a flint musket, or a pitch-fork, for the men's nerves are overstrained, and their weapon counts for nothing.

This moment, certainly, does not last for ever. A few minutes suffice to get these remnants out of the zone of their enemy's fire, and for them gradually to recover their breath, and to get fresh life; a new allowance of strength returns, and once more re-instates the murderous weapon—for a time useless—in its terrible power.

If the cavalry allows the enemy to make use of these few minutes, it deserves to be dismissed from the battle-field with disgrace and ignomity, but, if it makes use of this time, it is doing no more than its duty, and does so, unquestionably, at no great sacrifice. This picture of a defeated infantry is drawn by a German officer from facts, and he says it applies to all armies. It is his conviction, based on war experience, that cavalry, provided it instantly seizes on the moment of the enemy's discomfiture, can dash right up to his artillery positions and turn infantry and artillery into one confused mass.

With older tactics this was not possible to anything like so great an extent, for the rout of the defeated enemy never reached such a pitch as it does now; his moral strength never got so low as it naturally must now, when the decision is fought out for so long; and the troops never lost such a number of leaders as they do now-a-days.

All that appears to me to be quite sound, and I can only account for the defeat of the French Cuirassiers at Worth on the ground that that the charge must have been delivered too late. Prince Kraft writes thus of the charge:—"On the one hand the Prussian cavalry made successful charges at Vionville; but on the other, the charges of the French Cuirassiers at Worth against the Prussian infantry failed altogether.

An infantry officer who was present told me (i. e. Prince Kraft). with regard to a cavalry charge at Worth, that, at the moment our infantry were falling back down a slope from an attack which had failed, a hail of chassepot and mitrailleuse bullets followed them, and every one felt that he would never reach the cover of the wood which lay below them. Tired to death, and resigned to their fate, the whole of the infantry were slowly crawling towards the wood. Suddenly the murderous fire ceased. Every one stopped, astonished to see what had saved them from the fate which seemed certain. Then they saw the French Cuirassiers, who, as they pushed forward, masked the fire of their own infantry and artillery.

These Cuirassiers appeared to them like guardian angels. With the most perfect calm, every man halted on the spot where he stood, and fired at the Cuirassiers, who were soon swept away by the rapid fire.

With regard to the charge of the French cavalry on the Prussian infantry at Vionville, I was told by an eye-witness, who, as he commanded a regiment, had trotted up to the support of the infantry who were charged, but found that his assistance was not needed, and who had thus the opportunity of closely observing the contest, that he noticed to his great delight how bravely his comrades of the infantry stood their ground, and how scarcely any of them were ridden down; but that, as a cavalry man, his heart bled at the sight of the absolute powerlessness of the brave French cavalry against the calm and stubborn infantry, who did not even form square, but remained in the formation in which they happened to be, and quietly poured in their fire.

The French Cuirassiers of the Guard, well equipped and capitally led, charged in excellent order, and with the greatest possible exactness and courage. But their splendid horses fell in masses under the well-aimed fire. The centre of the line of the Cuirassiers, which went straight at the infantry, was annihilated. Then the two wings swung away from each other, were fired on as they passed by the battalion, and then ran the gauntlet of the skirmishers and supports. Thus in a few minutes nothing remained of this magnificent regiment of cavalry but a few scattered troopers, who had scarcely succeeded in cutting down a single infantry soldier."

If we sum up the experience which has been gained, we may say that successful charges of cavalry on infantry on a large and on a small scale, have succeeded in the latest wars, and may still be successful, even when the cavalry is inferior in number to the others. But as a rule, such charges can be crowned with victory, only when the enemy's infantry, owing to surprise, stress of battle, a mishap, or some other cause, has lost somewhat of their power of resistance.

A frontal charge against intact infantry will seldom succeed. The episodes in the battle of Custozza, where at Villafranca and Mongabia, cavalry obtained such astonishing success against intact infantry, must be explained by the fact, that this infantry, for some reason or other, had not the full value of intact troops. But, precisely because the attacking cavalry cannot be certain beforehand with regard to this point, the charge of cavalry against intact infantry ought not to be condemned in principle, and should certainly be commended, when the condition of the action is such, that the cavalry, even if it be sacrificed altogether, does such service to the whole army as is out of proportion to the loss which it suffers: for example, as at Mongabia and at Vionville.

We see, moreover, that cavalry charges, if they break out from the front of their own infantry and mask the fire of the latter, enable the infantry which is charged to gain time, owing to the cessation of this fire, to recover their formation; and that such attacks are thus, not only (as at Worth) without result, but are even of advantage to the enemy's infantry.

They have on the other hand greater chance of success, when they start so far on the flank of their own infantry (Bredow at Vionville), that the infantry and artillery can continue to fire up to the moment of onslaught, and can thus do their utmost to increase the destruction of the enemy's infantry.

Cavalry should therefore always endeavour, when they propose to join in a contest carried on by the other arms, to start from the flank of their own fighting line and to charge the flank of the enemy's line, and thus to give as much opportunity as possible for the fire of their own troops to take effect.

PART IV.

I will not now weary you by explaining in detail the drill book formations and evolutions of cavalry, but I will simply go through the board principles of the three-line formation. Most of you probably know already, that the three-line formation, taken from the German cavalry drill book, is the method in vogue in our army, and in all European armies, for manœuvring and fighting.

In the last camp of exercise the cavalry division, under General Luck, was formed of six regiments of cavalry. These were again formed into three brigades of two regiments each, with one battery of horse artillery attached.

On arriving at the drill ground, "rendezvous" formation was taken up, that is, the brigades were formed in three lines, one behind the other, each regiment being in line of squadron column at close interval, dressing to the left.

On the attack being determined on, "preparatory formation" was taken up, *i. e.* the first brigade took deploying interval from the centre of the brigade, the line being still in squadron column formation. This formed the 1st line.

The 2nd and 3rd Brigades moved off to the right and left flanks, still keeping line of squadron column at close interval. These brigades kept from 200 to 300 yards in rear of the 1st line, and slightly outflanked it. These two lines thus formed the supporting line.

The advance was then ordered at a trot; on nearing the enemy the 1st line formed line to the front; the supporting lines opened to deploying interval.

On the exact direction and moment of the attack being determined on, the "line will attack" was ordered, the pace was increased to the gallop, three squadrons from the left supporting lines were sent in direct support, i. e. they followed 150 yards immediately in rear of the 1st line, two squadrons dividing the distance of the front of the 1st line between them. The 3rd squadron was echeloned on one flank.

The supporting lines then formed line to the front.

The pace of the whole mass of cavalry was then increased until about 16 or 17 miles an hour was reached. Then, when the 1st line was within some 60 yards of the enemy, the charge was delivered, the trumpeters all along the 1st line sounding the charge simultaneously, the men cheering, and the charge being delivered at top speed.

The rally and pursuit, the retreat covered by the 2nd line, and other manœuvres were then gone through.

I have not mentioned that, as a matter of course, the usual ground scouts were thrown out, preparatory to the advance, and one fighting patrol of one N. C O. and six men sent out from each brigade; The 1st line to the front, the 2nd line to the flanks and rear.

The above is the recognized normal fighting formation of a cavalry division, but, of course, this may, and indeed must, be modified to suit the circumstances of the moment.

A German cavalry officer writes thus on the subject:—

"Accurate drill is the essential condition of every manœuvre, and without skilful and rapid manœuvres there can be no cavalry success. Drills and manœuvres go together; by means of them both, the troops must not only learn to see their way in every situation, and to conclude from every situation what will be the proper fighting tactics for that moment, but the commander must also learn from them to command his instrument in such a manner, that in action there may arise no situation for him, in which he might not be able to make full use of the strong points of the tactics of his arm."

Every kind of tactics must struggle in this way, and in order to attain this end, the arm concerned must constantly practise its principal fighting formation, and be complete master of all movements which must precede the tactical deployment of strength.

It is because the German infantry has continually kept this in view, that it has reached its high state of manœuvring power, and the readiness of being able to improvise the precise fighting tactics required for each case.

Cavalry must act in exactly the same way, and then the general opinion will be, that there is no normal fighting formation for cavalry divisions, just as there is no such thing for the infantry brigade.

Of course that cannot be called "want of system and arbitrariness," it is rather reaching such a point by means of system, order, and practice, that for every case of actual fighting the tactical forms should come naturally, as it were, while the security of the organism must not be injured by any of these forms.

The tactical forms of cavalry must of course vary according to the arms against which it has to fight. It can arrange its forces in any number of different ways for fighting against cavalry; on the other hand, it will choose extended lines with advantage against artillery, and echelons against infantry, at least when it has to fight against large masses of either of the two last arms.

Now, since the action of cavalry during both its strategic employment and the battle is, naturally, first of all directed at engaging the the enemy's cavalry, its fighting tactics against its own arm must always be of first importance. In this way, we can't do wrong if we train the cavalry division above all as an evolutionary body, so as to regulate its movements, to accustom it to the greatest possible rapidity, and to train the commanders of the various sides. The most precise drill must be first thoroughly mastered, and then manœuvres practised against an opponent. Then, and not till then, will the talents of the commanders show themselves, will the efficiency of the troops be proved; and then only will a normal fighting formation be dropped, and the best formation for each case will be improvised.

I have not here touched on the employment of horse artillery with cavalry, nor of machine guns; I have purposely omitted this, preferring to leave these matters to the distinguished officer of the Royal Horse Artillery, who is to lecture to you next month.

Now for a few words on the dismounted service of cavalry. All cavalry officers will agree with me, I think, in saying that a cavalry man must be able to fight on foot, and ought to be a good shot. At the beginning of the American War, both sides were totally unprepared for hostilities, and armies had to be organised, drilled, and equipped, before operations could be begun. With regard to the cavalry, both sides were at first inclined to act upon the idea, then very prevalent, of the uselessness of mounted men against modern infantry firearms; but they soon discovered their mistake, and the mounted service increased rapidly; so much so, that at the latter end of the war the Northern States maintained no less than 80,000 cavalry, almost all of whom were equipped with rifles or carbines.

France and Germany, however, do not seem to have benefited by these experiences, and it was only after the Franco-Prussian War that they were taken to heart. We read, that even on scouting and reconnaissance duties, as soon as the "Franctireurs" were organised, the training, equipment, and armament of the much vaunted Prussian Uhlans rendered them quite unable to cope with foes who, though brave, must, from want of training and organisation, have been contemptible in themselves. In order to deal with them, the Prussian cavalry had to arm themselves, as is well known, with chassepot rifles taken from the enemy, or to be accompanied by infantry, in order to clear the villages of these volunteer riflemen.

The result of this was, that after the war all the great military powers of Europe armed their cavalry with a long range carbine, and trained them to fight on foot and to shoot straight, in addition to their other duties. Russia especially took up this idea, and turned most of her cavalry into dragoons, armed with the long rifle and bayonet. In the Russo-Turkish campaign, the value of these troops was shown, when General Gourko, and his dragoons did splendid service in his raids across the Balkans, in his capture of Tirnova with one brigade of dragoons, a town of 60,000 inhabitants, and held by three battalions of Turkish infantry, in the capture of Kazanlik, and later in the retreat.

Dismounted cavalry can now in all cases where there is any cover available, place their horses in rear, and taking up a defensive position, can annoy an enemy with dismounted fire at 900 yards, can inflict loss at 600 yards, and after that can pour in volleys with precision, so that an action might in many cases be settled before the approaching enemy could come within 200 yards.

The dismounted men could then run to their horses, mount, and gallop away in case of being overmatched.

The question has been asked :—What ought cavalry, when acting dismounted, to be able to do?

Colonel Trench gives the following answer: 1stly. It ought certainly to be able to hold its own, and when fairly matched, to be able to overcome the opposition of the enemy's dismounted cavalry. 2ndly. It should be able to overcome the opposition of weak infantry detachments, so that a small body of the latter arm should not be able to hold superior bodies in check 3rdly. Cavalry should be able to occupy rapidly with dismounted men any important and distant point, and to hold it against the enemy till the infantry of its own side can arrive. 4thly. Cavalry should be able to provide for the security of its cantonments and to defend them from attack.

In acting thus, care must be taken that the cavalry does not become mere mounted infantry, which is the very last thing to be desired. All that is demanded of it is limited to its being able, when occasion may require it, to render such services as those just detailed. It is now laid down as an axiom, that cavalry which cannot fight on foot under certain conditions, is not up to the requirements of modern warfare, nor is it worth the sacrifice which it costs the State.

Now, as to the defensive action of dismounted cavalry. The occasions on which dismounted cavalry will be able to render good service to its own side by defensive action, will generally be far more numerous than those upon which it will be forced to take offensive action. The principles which should guide its action on the defensive are the same as I have already detailed.

I will now read you some instances from the American Civil War, showing what cavalry can do acting on foot and on horseback.

Some of General Stuart's Confederate Cavalry were attacked near Poolesville by the Federal troops. General Stuart thus describes the action: "I ordered the charge, which was responded to in handsome style by the advanced squadron of Lee's brigade, which drove back the enemy's cavalry upon the column of infantry advancing to occupy the crest from which the cavalry were driven. Quick as thought, Lee's sharpshooters sprang to the ground, and engaging the infantry skirmishers, held them in check till the artillery in advance came up, which under the gallant Pelham, drove back the enemy's force upon the batteries beyond the Monocacy. Occupying the crest, which I used as a screen to cover my real movement, I made a rapid dash to my left to White's ford, which was guarded by 200 infantry strongly posted in the cliffs. A few shells from the small guns and the attack of the dismounted cavalry soon drove off these enemies, and the passage of the ford was effected with all the regularity of the passage of a defile at drill. The enemy came up just as the whole force had safely effected its crossing."

Again, at Trenton, in December 1861, Forrest charged the enemy with a portion of his cavalry mounted, and drove them into a fortified position which they had strengthened with a breastwork of cotton bales and hogsheads of tobacco. Halting within 50 yards, he withdrew his force some 200 or 300 yards, so as to obtain cover, and then dismounting these same men and bringing up some guns, he opened such a fire of small arms and artillery, that the Federals soon surrendered, and his small force, consisting only of his cavalry escort and of a few artillery, in all not more than 275 men, were able to sum up the fruits of their victory,. They amounted to 400 prisoners of war, 300 negroes, 1000 horses and mules, 13 wagons, 7 caissons, 400,000 rounds of small arms ammunition, together with a great quantity of equipment, stores &c.

This was gained by a gallant charge of about 200 horsemen, which drove the enemy into their entrenchments, followed by a bold attack by these horsemen, acting dismounted as infantry.

Again, in a retreat, cavalry by dismounted fire might arrest for some time the enemy's pursuit, and prevent the retreat becoming a rout. Also for the protection of artillery against infantry sharpshooters, creeping up over ground inaccessible for mounted men, dismounted action of cavalry is essential.

To sum up then, the circumstances and conditions under which dismounted service may be resorted to by cavalry with a fair chance of success, we may state as follows:—

1. When from circumstances, or the nature of the ground, there is nothing to be hoped for from mounted action.
2. When the desired result is likely to be at once attained by the prompt and decisive action of dismounted men.
3. When it is important, at all hazards, to retard and delay the progress of the enemy.
4. When there is good shelter for the led horses during the attack and defence of a position.
5. The men should be properly trained and able to shoot well; to attempt to fight dismounted with untrained men would be to court disaster.

I have not touched on mounted and mobile infantry, in this lecture. My reason for not having done so is that I am of the same opinion on this point as General Keith Fraser, the Inspector-General of Cavalry in England, who, in a lecture the other day, said that "he did not see any reason why cavalry armed with rifles should not do all that Sheridan's men ever did, and he did not see what a mounted infantry man could do, that a cavalry man could not do better."

I think now, that the old proverb, "the infantry soldier who is shot by a cavalry man must believe in destiny," no longer applies.

SCHEME FOR FORMING A MILITARY POLICE RESERVE AND ESTABLISHING MILITARY (INDIAN) COLONIES IN BURMA.

By Lieutenant R. M. Rainey,
2nd Burma Infantry.

The maintenance of peace in Burma, and the protection of her frontiers, are at present insured by a large force of Indian Military Police, supplemented by three local regiments of the Madras army, which have lately been formed from picked Military Police battalions, together with several ordinary regiments on the Bengal and Madras establishments. It is hoped before long, when a few more local regiments have been raised, that they, together with the Military Police, will be able unaided to answer all calls, and that the regiments other than local regiments will thus be released from service in Burma. The up-keep of the Military Police is a very heavy tax on the country, and while all who have had any experience in Burma are agreed, that for some years yet to come it would be highly dangerous to denude the country of troops and military police; yet the time has come when a greater concentration than has hitherto been possible might with advantage be adopted. The results of concentration would be greater efficiency in drill, musketry, &c., while discipline would also be improved, owing to more European supervision being possible. Once such concentration has been effected, and when experience has shown that no increase of violent crimes, and no reorganisation of dacoit bands has followed as a result of the withdrawal of the scattered out-posts (which withdrawal should, however, be very gradually and unostentatiously carried out), then the question arises,—cannot reserves be formed which would lessen the heavy expense of maintaining the Military Police, by enabling the numbers with the battalions to be reduced; while the actual number of trained men still in the country, and who could be called out if necessity arose would be in no way decreased? From careful enquiries among men serving in the Military Police I am confident, that not only could such a reserve be formed, but together with it, and in fact as part of the same scheme, military colonies of agriculturists could be successfully established.

I will here briefly state, that several attempts have been made by the local government to establish Indian colonies in Burma, and that grants of land, free passages from India, and pecuniary assistance in the shape of loans, have all been offered; while similar inducements have been held out to the men of the Military Police serving in Burma. The terms and conditions of these privileges have been published in the Burma Gazette. But while neither have the colonists from

India flourished, nor the men of the Military Police sought after grants of land much, yet it cannot be assumed that Indian colonies are a failure; because no very great interest has been taken in these colonies, nor have the best steps been taken to attract the right class of men. The welfare of the colonies has not been the special duty of any particular officer, but quite the reverse, as the colonies have been extra work thrown on to the already over-worked district officers. It is unnecessary, however, to discuss the causes of failure in the past, but I will endeavour to show how success may be looked for in the future.

I am of opinion that reserves could not be formed without at the same time establishing colonies, and vice versâ; as the reserve pay unsupplemented by income derived from other sources would be insufficient: while the difficulties and failures, inseparable from the commencement of a colonisation of this nature, might prove fatal, if the men were not bound down to the country by other ties, and assisted by regular payments, independent of the proceeds of their cultivation. Under these circumstances I will deal with the combined subject.

As the Military Police far exceed the local regiments in numbers, and as the payment of the Police is a local and not an imperial charge, it would be necessary to organise, and constitute these reserves as Police reserves. This need not prevent the men of local regiments, who elected to pass into the police reserves in Burma, from doing so; but men who preferred returning to India on completion of their service in local regiments, might be passed into the army reserves in India on Indian reserve pay only.

The terms of service and pay of the men of these reserves should be more or less similar to those in force for the time being for the native troops in India, plus a small Burma allowance.

Grants of land and advances should be continued as at present, subject to modifications if found advisable.

Pensions with a small increase, which might be called Burma allowance, thould be granted to those willing to remain in Burma on completion of service.

The reserves, to begin with, should be organised into one battalion, sub-divided into local companies. This would be an experimental organisation to be increased if the reserve proved a success.

District companies would be formed in numbers according to the strength of the colonies in any particular locality.

Colonies would be established in suitable localities as land was available; due regard being had to the nature of the soil, which should be suited for the cultivation of the particular crops that the colonists had been accustomed to grow in their own country. Wheat would naturally be the most essential crop. As far as possible, these sites should be selected with reference to the strategical importance of the situation. The villages should be built on defensible lines, and should not consist of less than a stated number of houses.

The reserves should be under a battalion commandant of experience and tact, who should also be in general charge of the colonies. He should have one or more assistants as required. His head-quarters should be at a central place, such as Mandalay. His assistant might have his head-quarters at some other station if found advisable.

The duties of the commandant and his assistant would be, (*a*) the payment, annual training, &c., of his men, (*b*) the general supervision of the colonies under the deputy commissioner of the districts in which the colonies were established. This would embrace not only supervision, but it would be necessary for the battalion officers to take an interest in the agriculture of the men, to encourage and assist them with advice, &c., &c.

At the head-quarters of the battalion a small permanent staff would be necessary, and here all spare arms, accoutrements, ammunition &c., would be stored and looked after.

At the head-quarters of the districts in which colonies existed, would be kept the arms and pouch ammunition of the company or companies of the colony a few arms; and a small quantity of ammunition, being, when necessary, issued for the protection of more exposed colonies.

To start with, I should advocate the establishment of a Sikh colony, because Sikhs are least likely to take employment other than agriculture. Muzbi Sikhs, low caste Hindus, &c., are very apt to go as coolies on any public works. Mussulmans have a tendency to migrate into towns, and start shops &c., and also to ally themselves with Burman women. Hindustanis have greater difficulties owing to caste prejudices. Maja colonies should be kept separate, as should Muhammadan villages, if such were established.

To attract men to the reserves, and to induce them to become colonists, the first step is to offer inducements and facilities to the men of local regiments and police battalions to get their womenkind over. This they have already shown an ever increasing inclination to do as the country has settled down. When the women have come in sufficient numbers, and have become accustomed to the climate of the country, they will not readily undertake the trouble and expense of a return journey.

If it is not considered advisable to increase the proportion of women allowed with a battalion, passes might be granted to wives, and one or more relatives in excess of the present proportion, on condition of their living in, taking up, and cultivating land in one of the colonies. The more women there are in the country, the less inclination will the men have to return to India. The married men will have their families within easy reach, and will be able to visit them frequently on short leave. The unmarried men would be able to suit themselves with wives from among the daughters of men of the battalions, reserves, or pension establishment; and as ties of this nature increased, the desire, and indeed possibility, of returning to their native country would decrease. For example, suppose a man now serving in a battalion, who has a wife in the country and several children, is in time drafted into the reserve: his daughters would in all probability be married to young fellows in one of the regiments or battalions, who will in the natural course of events themselves join the reserves, while their father-in-law will in time take his pension in the country to be near his children, and so on.

Relatives of men or others, who have paid their own way over, should be admitted into the colonies, only on condition of their adhering to all existing rules and regulations.

Alliances with women of the country should be discouraged as far as possible. Marriages of this sort do not appear to produce a useful class of children. The men lose caste and sink in the social scale. These matches do not bind them to the country, so the women and children are liable, and indeed almost certain, sooner or later to be deserted.

Irrespective of the rules and regulations necessary for the effective administration of the reserves, the men, as colonists, should be as little tied down to the country by hard and fast rules as possible. While colonists remained in the reserves, it would be a necessary measure to prohibit their leaving Burma without leave, as it might be necessary to call out the reserves suddenly, and it would only be safe to allow a fixed percentage to be absent at once; but others than those actually in the reserves should not be tied down, further than their obligations in the way of refunding loans, &c , from government, are concerned. If men thought that they were being permanently separated from their relations and friends in their own country, and that they were being exiled from their native shores, very few would accept the terms. The death of a father, or brother, &c., would frequently leave the bit of ground in their native village without a cultivator, and exposed to litigation from grasping neighbours; and under these, or such like circumstances, the colonists would require perfect freedom of choice, as to whether the family concerned would return to the Punjab, depute a member of their family to do so, or to remain in Burma. As a matter of fact, it would be found that the majority would remain, and tying them to the country would defeat its own end.

The reserve as a body should only be liable to be called out by order of the inpector-general of police, but deputy commissioners should be empowered, under restrictions, to call out in cases of sudden emergency the reserve company in their district; the proportion to be left in a village for its protection, to be fixed by the inspector-general of police. When reserve men were called out, they would be attached for rations, discipline &c., to the battalion of military police of the district, where their services were required, except in the case of the embodying of a large unit, say half a battalion, when these arrangements would be made by the commandant of the battalion.

The most suitable season for calling out the reserves for their annual training would be the off season, when very little cultivation is going on, and this is fortunately the season when dacoity is most prevalent. However, dacoity is now becoming a thing of the past, and need not be considered a serious obstacle; but it is absolutely necessary that the cultivation of the military colonists should be as little as possible interfered with.

The reserve men would only be subject to the military discipline legislated for in the Burma Military Police Act, when embodied or called out for training. For maintenance of order in colonies, nothing more would be required than the present very excellent "village regulations", which are based on a system peculiarly adapted to military colonies.

In each colony a proportion of mechanics, priests, sweepers, musicians, barbers, &c., would be required, so as to render each colony entirely independent and to enable marriage, funeral, and other ceremonies to be carried out with facility. Passes from India should be granted to these necessary appendages to a colony, together with their families.

Once the colonies were fairly started, taxes should be imposed as usual in Burma. For the first few years they should be remitted entirely.

If a combined reserve force and military colonisation scheme were started on lines as shown above, which, however, could certainly be largely improved upon, there is little doubt but that success would be assured. It is hardly necessary to point out the many advantages which would accrue from such a scheme, but the most prominent are, (*a*) reduction of the heavy expense of maintaining military police; (*b*) increase of the scanty population of Upper Burma by colonies of loyal subjects, capable not only of protecting themselves, but also their less warlike fellow-subjects the Burmans, also affording recruits bred in the country of a good fighting stock; (*c*) the introduction of a class quite distinct from the indigenous races, who would have no sympathy with any rising among these races, and who would thus form an additional check on rebellion: the advantage of having our own subjects in preference to Chinese, or other foreigners, it is unnecessary to point out; while the establishment of Indian colonies in a foreign land would necessarily be a check on rebellions in India; as the isolated position of their relatives in Burma would cause the disaffected to hesitate, before exposing them to the retributions which might be expected to follow a rising on their part; (*d*) the relief afforded to overcrowded India by the establishment of colonies would be invaluable, and this is already recognised by the men in the police, who complain of the increasing difficulty of obtaina living in their own country; (*e*) the cultivation of wheat in Burma, which would considerably reduce the expense of feeding the Military Police, as once wheat became cheap, the pay of the men could be considerably reduced.

THE DEVELOPMENT OF CAVALRY TRAINING IN INDIA.

By Capt. G. O'CONNOR, Queen's Bays.

"That side alone of the belligerent parties will have its work well and usefully done, which succeeds at the first in beating the enemy's cavalry." Starting from this as the ground-work upon which the development of our cavalry must be built up, we are at once confronted with the problem,—Are the methods, well thought out and exhaustively practised as they are, adopted by the continental nations, from whom we are content to learn, applicable in all their rigidity to our circumstances?

The tendency of civilized warfare has of late been to subordinate tactical to strategical considerations, a tendency traceable to the immense numbers of modern armies, the improved means of massing these numbers and of supplying them. These huge armies again, by limiting the area of operations, lead up to cut and dried plans, in which strategy is predominant, and the influence of tactics necessarily is but slightly considered.

Recognizing this, we find continental cavalries assiduously practising mass tactics, with a view of obtaining preponderating influence in the early stages of the campaign and particularly on the actual battle-field, by the action of troops similarly equipped and circumstanced, where the area of operations is known, and the physical difficulties to be overcome, are those with which the combatants are familiar. In fact, the object of all their aspirations is to acquire the power of delivering the most effective shock. They have constantly before their mind's eye the spectacle of large bodies of horsemen rushing madly on to engage in a death grapple, where, having discarded the sword in favor of a more purely offensive weapon, it will only be by scientific leading and perfect training, backed by stout hearts, that they can hope to prevail.

Fascinating as the idea is, these aspirations are not for us; they are founded on theories derived from events, which have recently occurred, and which can never be parallelled in the east, and on the future aspects of warfare under well known conditions, conditions with which we have nothing in common. Can the conclusions thus derived be of equal importance to us, or are we under the necessity of looking about for data more applicable to our different circumstances?

Most emphatically we are; and without calling into question for a moment the correctness of the continental principles of cavalry employment, it is in the application of these principles that we are bound to differ from others, differently situated to ourselves.

The undeniable improvement which has taken place within the last few years, in British and Native Cavalry serving in India, whilst affording great satisfaction, obliges the mounted arm to complete and supplement that efficiency by devoting its attention to other methods of training, methods calculated to obtain the opportunity to display this efficiency.

To indicate the lines upon which this further training should run, it is necessary to understand the raison d'être of the immense cavalry force, proportionately greater as it is than in the armies of other powers, which is now maintained in India.

There is no native state, within or immediately contiguous to our frontier, whose suppression would call for any great effort. Beyond our frontier, Russia has approached closer and closer, until, where before it was a matter of months, it is now an affair of days, within which a collision may take place.

By the construction of the trans-Caspian railway, Russia is able to launch considerable forces against the frontier of an ally, in the preservation of whose autonomy we are vitally interested. Not only could the garrisons at Karki, Chaharjui, &c., be easily pushed forward on the Afghan frontier, but by means of the railway the troops already in motion could be reinforced, and the depleted garrisons refilled.

Besides this menace, always present on her eastern frontier, the railway has conferred on Russia the power of supplying her troops with water, food, and war matériel; and at the same time has miminised the risks to which they would be exposed from climate &c., by shortening the time of exposure, until they were present in the theatre of war,

Thus, concisely stated, is the present position of affairs, and it would be the most transparent affectation to attempt to disguise the fact that it is Russia with whom, eventually, we shall have to reckon. To discover the means to deal with him most effectually as far as the cavalry are concerned, it will be advisable to place before us his probable offensive power both of organization and training, and the description of country, which from proximity and strategic reasons, is most likely to be the scene of operations.

Not included in the Russian European mobilization dispositions, we find 4 divisions of cavalry, or 72 squadrons (Europeans). We are warranted in supposing, that in the event of complications with us, the present composition of their cavalry divisions would be assimilated to our own organization, and that instead of one Cossack regiment to each division, there would be two or even more, and the restriction against the Cossack cavalry being in the first or fighting line would, against our native troops, be removed.

In the last European war the Russian cavalry as a whole were undoubtedly wanting in boldness and enterprise, a defect which was not atoned for by their readiness to defeat the Turks in combat, for despite their inferiority the Turkish cavalry appear to have had frequent successful combats with their opponents.

That we need have any doubt as to the ability of our horsemen to repeat the exploits of the Heavy Brigade in the Crimea, would be to ignore the greater comparative advance towards efficiency (of the continental type) which our cavalry has made, and to be unaware of the retrograde condition of the Russian cavalry, caused by their futile conversion into mounted infantry. It is not the regular European cavalry *per se* that we need fear: their national characteristics, traditions, and habits are against them, their pre-eminent military quality of stolid resistance to attack has shown itself in their tactics, of on more than one occasion, receiving a charge at the halt; but invaluable as this quality is to the infantryman, it is not a necessary ingredient of the successful cavalry soldier.

But poor as is the material, the Russian cavalry soldier, owing to the system under which he has been trained, might be most formidable to our men in the most effective species of warfare. Unable to meet us in the open field, the Russian cavalry, well trained in raids, reconnaisances, the crossing of rivers, and the useful details of cavalry pioneering, with the staying powers of himself and horse developed to their utmost, will on most detached duties prove the equal of our men, whether British or Native.

So much for the material of the European troops. But before a collision of any importance takes place, the Cossack will have to be brushed aside. The Cossack, in his ability to perform the duties of exploration and security, is as relatively superior to his comrades of the European cavalry, as they in respect of their thoroughly practical training are superior to ours. Students of cavalry tactics of the Napoleonic wars are aware of the dread, resulting at last in positive disorganization, with which these ubiquitous horsemen inspired the well led and hitherto successful French cavalry. There is no reason to assume that the Cossack has since deteriorated; their comparative failure in the Crimea can be attributed to the circumscribed area of operations. It would be much better to suppose, that by becoming less irregular they have acquired the necessary discipline to enable them to resist the isolated attacks of small bodies of European cavalry.

To give free scope to the peculiar methods of training in vogue in the Russian cavalry, there is only one factor required; a suitable theatre of war. Looking north from Quetta, we find the whole country (with the exception of the south-western corner) enclosed in the irregular parallelogram between Cabul, Kamiab, Herat, and Kandahar; an area of about 45,000 square miles; covered with numerous ranges of hills, varying in height from the Safed Koh, and Paghman ranges, to the low hills in the neighbourhood of Farah; between the hills are a succession of high rolling downs gradually receding into plains, with long, low, and broad undulations, and an occasional isolated sand hill.

Intersecting the country in every direction are the rivers Argandab, Helmund, Farah Rud, and Hari Rud, each of them with numberless affluents, and deep canals; their numbers making the surrounding country peculiarly liable to sudden floods, with every small stream an impassable obstacle. The whole country is fairly well populated, and but thinly cultivated, its general appearance being that of innumerable waves suddenly stilled in their rolling action, and converted into bright yellow sand. Thickly dotted over the sandy wastes is the saxaoul plant, useful no doubt for fuel, and to transport animals, but from its size affording no assistance to the military engineer.

Frequent oases, surrounded by a vegetation of tamarisk, camel-thorn, and absinthe, are met with, nor is there any dearth of villages, each of them surrounded by high square walls, capable, with very few tools and little preparation, of being converted into miniature forts. Were it not for the numerous streams and water channels, cavalry could traverse this country in every direction: as it is, except during and immediately after rains, light wheeled transport can be used, but, although the country is in many places particularly suitable for cavalry action, the detached services could only be efficiently and promptly carried out by men accustomed to surmounting natural obstacles.

Assuming that the cavalry maintained in India are principally intended for repelling an attack from beyond our frontier, and that they at any rate would be pushed beyond the Helmund, by attempting to base our instruction and tactics on those of European cavalry, are we not making a grievous mistake, one not only likely to lead to disaster, but which retarding the development of our cavalry strength in the right direction, will eventually make the mounted branch a drag on their comrades?

In the dissimilarity between the forces likely to be brought into action, in the more natural and less civilized conditions under which operations will take place, the physical and climatic difficulties to be overcome, added to the necessity of keeping up extended lines of communication, we are not at a loss for examples to study from. In Napoleon's Russian campaign, the events of the American Civil War, and the late Russo-Turkish campaign, there are plenty of reliable data which can be accepted by cavalry officers.

The common objection to studying the cavalry tactics of the American Civil War is, that the cavalry restricted themselves to mounted infantry work, and proved the superiority of the revolver over the sword. With regard to the first, in the early stages of the war this undoubtedly was so, but as the combatants became better organized and commanded, later on we find that actions between the cavalry were much more frequently decided by shock action alone than is generally supposed, notably the actions at Monterey, Parker's Cross Roads, Ebenezer Church, &c. The damage done to the enemy's flanks and communications, the information gained and placed at the disposal of the army commanders, and the consternation caused to the enemy, were out of all proportion to the losses in the raids of the American cavalry. That they were able to carry out this self-imposed, and novel rôle so effectually, was due to their skill in scouting, reconnaissance, and outposts, combined with their ability to march long distances rapidly through any description of country. That their success was not due alone to any peculiarities of organization and equipment, is proved by the example of General Stuart's raids in which the cavalry were at first without carbines, and were always accompanied by baggage wagons. Similarly, Sheridan's horsemen carried in dead weight on their saddles quite an equal amount to that laid down in our field service equipment regulations. In short, the key to the unparalled successes of both Northern and Southern cavalry must be looked for in that their mobility and superior intelligence were brought into play, not only in the actual encounter, but as a means by which they rendered themselves perfectly safe from surprise, whilst surprising the enemy.

General Gourko's raid across the Balkans may also be fairly mentioned as an example of the work which will be required from cavalry in thinly populated and extensive countries, and against an enemy able to exist on the minimum of commissariat and transport.

Theoretically, both British and Native cavalry are supposed to be proficient in all detached duties. At inspections and camps of exercise, the Inspector-General sees and comments on the performance of these duties, but at camps, the only real opportunities, the occasions are so infrequent, that in the majority of regiments the practical knowledge is usually only superficial.

How often have regiments an opportunity of working over strange ground in the services of exploration and security, against a force whose first dispositions they are unacquainted with, in a manner which the varied expanse of country will admit of, and the presence of regimental transport could render so like service conditions that something must be learnt?

How many cavalry soldiers are aware of the extreme difficulty of moving even small bodies of cavalry over comparatively well known country at night? and how many commanding officers would cheerfully accept the responsibility of swimming their regiments over a stream of any depth or current? The fiasco at the Berkshire manœuvres should bring home to us the fact, that in one respect at least we are no better trained than the regiments at home. It is in the unaccustomedness of performing service work, under approximately service conditions, that all our fine material, drill, and preparedness are discounted.

On the Native Cavalry in a campaign would fall the burden of most of the advanced duties. They at least should be familiar with the destruction and repair of bridges, construction of rafts, and other means of crossing rivers, and the construction and demolition of obstacles, light railways, and field telegraphs; from their habits and local knowledge they have a natural aptitude for work of this description; their British officers, although through garrison classes &c. they are acquainted with the theory of cavalry pioneering, demolitions &c., never have the plant or opportunity to practise or keep up their knowledge.

In short, to crown the edifice of our present efficiency, we want more of the work of which the results can be seen equally as well as parade movements, and field drill, both which, though they do not appeal to the gallery to such an extent, are really the foundation upon which rests the possibility of our ever being able to bring into effect the more strong parts of the cavalry soldier's training.

To revert again to the aphorism of von Der Goltz. There are two methods of beating the enemy's cavalry, one by defeating them in the field, the other by wearing them out: confident as we are of being able to do the first, it behoves us to prevent the second being our fate.

NOTES

By Colonel G. SARTORIUS, C. B.,

Made while attending the military exercises, drills &c., of the Saxon corps d'armée stationed at Dresden.

While I was at home the year before last and last year, I got leave to be present at the drill and training of recruits belonging to the Saxon corps d'armée at Dresden. For this purpose I was specially attached to their best regiment, the Königliche Leib Grenadier Regiment, and was thus enabled to follow out the training of the recruit right up to the time when he took his part in the autumn manœuvres of the army. There was some difficulty in getting leave, but as soon as the official doors were opened, the regimental officers were most kind and hospitable, and gave me every help possible.

The course begins in November and ends in the manœuvres of autumn. Officers and men are under the same rules, and I will therefore start with a few words about the first.

In order that officers on joining should be thoroughly up to their work, they have invariably to go through a complete course of training. If, after this year's work, there happens to be no vacancy, they continue their work in the ranks like any other soldier, and have to wait their turn perhaps a whole year. Consequently from the moment a youngster gets his commission, he is thoroughly fitted to undertake the instruction of recruits. This task is always given over to the young officers, and it struck me very much to see the confident manner with which a 2nd Lieutenant on his first parade took over the recruits squad, and gave the most precise and correct instructions to his non-commissioned officers. This excellent outcome of the training in the ranks that he had received, did not in the least affect his bearing as an officer, because while going through his training in the ranks, he yet otherwise associates with the officers, joins their mess, their shooting club &c., and indeed is always treated as their future comrade.

CHAPTER I.

There are some things in the general line of instruction which are very good. Perhaps first of all, is the very careful way in which every officer and man is prepared for the next step he should attain. A general knowledge of all military work is thought good, but a particular, careful, and very minute knowledge of all that regards the next step in rank is the aim of every officer and man to learn, and of every senior officer to see that it is learnt.

Next is the very earnest attention given at the commencement to precise detail, and the disregard of the same, whenever under circumstances of (imaginary) active service, *i. e.* manœuvres or field days,

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such precision would militate against the supreme object of utmost damage to the enemy, and, when that is not interfered with, the least damage to oneself!

Taking them all round, the ordinary German recruit is at the start off a very great lout, excessively untidy and by no means clean. His knowledge of his *Heimath*, or home, goes but little beyond the boundaries of his village. The *Vaterland* is but a vague idea.

A single year transforms that ignorant lout into the smartest and tidiest of soldiers, with a full knowledge why he must be ready to obey the call to arms, and a fixed determination to dare and do his utmost whenever so called out.

I have often heard the German soldier laughed at for being such a machine. He was so in Frederick the Great's time, and is so now, but with the most important addition, that to the physical strength the great military reformers have added moral strength. There is soul in the machine now. What was the heavy built waggon of the last century ploughing along the rough roads of that day, is now the light railway engine running along its rail and doing more work in a day than the other did in a year. Far stronger and how much more effective! Every element of the German has been appealed to, and it seems to me with such success, that I cannot even imagine the German army being eventually beaten.

Returning though to the matter more especially in hand, there are two classes of recruits, the one year and the three years. The first of these consists of men of good education &c., to whom it is of importtance to return to their normal business and occupations as soon as possible. They have a proportionately harder time, and have to pass examinations at the end of the year. Their number is not large, and as their instruction is only a concentrated essence of the course gone through by the second class or ordinary recruits, I pass to them.

On the arrival of the latter in barracks, the Captain of the company interviews each separately, carefully noting their occupations up to date, their physical conformity, and any other particulars that may strike him. With the knowledge thus acquired, he is enabled in many cases to give distinct orders as regards their initial training. Thus a tailor usually requires such extension motions as will develop the muscles of his legs. A journeyman miller, accustomed to carry heavy bags of flour, wants his back straightened. So does a ploughman. A short sighted man must have spectacles. A long sighted man must be looked after, as he may make an effective squad leader &c., &c.

Instruction begins at once. No time is lost, the following being the routine for last year's recruits, *i. e.* those who joined in November 1889 and went through their first manœuvres in September 1890. This is their principal training,—the next two years are little else but a somewhat modified recapitulation.

General instructions are issued by the Colonel commanding the regiment to the Captains of companies, who thereupon submit their programme of instruction. On approval, this programme is made known to the various subaltern officers concerned, thus :—

General remarks by the Colonel :—

The instruction staff will consist of,

1 officer.
4 non-commissioned officers (*unter offiziere.*)
8 lance-corporals.

(*N. B.*—The officer is usually the last joined subaltern.)

On and from the 3rd day a special musketry non-commissioned officer will give two hours daily instruction.

The hours for drill are three hours in the morning and two in the afternoon.

Besides the above, there will be daily lectures (except on Saturdays) of from 1½ to 2 hours, viz., from 6¾ A. M. to 7½ A. M. and the remainder in the afternoon, but not before 5 P. M.

When planning out the work, it must always be kept in mind, that should weather not admit of outside drills, such others must be substituted as can be carried out in-doors, and prevent any extension of the time previously determined on for the whole course of recruit instruction.

Men who are specially backward at drill, and defaulters, will have an extra drill on Saturday afternoons of from 1½ to 2 hours.

Sunday mornings and Saturday afternoons will be employed in a general clean up and overhauling of full dress clothing, private things, rifle, cupboard, and all regimental necessaries.

From the third Sunday onwards the recruits will be marched out in their squads.

One hour's theoretical instruction will daily be given by an officer. This line of instruction will take in all part A of the regulations and will be as follows :—

First.—Articles of War. Code of military punishments. Proper method of making complaints.

Second.—Military ideas and duties of a soldier.

N. B.—(The lectures at the commencement of the course are greatly directed towards giving a soldier a true idea of patriotism, of his duties towards the fatherland, and the state. To tell him whom he may have to meet, and why. The consequences of failure and glory of success, &c.)

"*Third.*—Musketry instruction (particularly to be brought home to each individual), such as the simple rules for loading, firing, and aiming. As soon as the recruit knows how to shoulder, he must begin his instruction in musketry practice.

Having got on so far, the reasons for open order fighting should now be made clear to the recruit by taking him to some spot conveniently near, and there letting him see a detachment of older soldiers going through the necessary evolutions.

Next, his pride and understanding must be awakened by telling him of sundry simple actions during war time, and thus bringing him to proper knowledge of the high and honourable duties devolving on him by his call to be a soldier and defender of his country.

Fourth.—The proper mode of attack and defence, as well as the correct use of the ground to increase the force of attack as well as the possibility of defence, is to be demonstrated, by placing men opposite to him at varied distances in and out of range, and in positions covered and uncovered.

For the above purpose the recruits must be taken out at least twice a week. Besides being a good change from the ordinary drill parade ground, it is also the only means by which a soldier can be made to intelligently understand, as well as do, the ordinary movements and exercises on parade.

In the same way it is made clear to him how and why extended and close order are carried out in different ways, though both have the invariable intention of the utmost damage to the enemy with the least possible loss to oneself. Much time must be taken over this, for the careful training of a man can only be ultimately successful by constantly repeating the same thing *at the time*, as well as on future occasions. Soon some will come to the front, and these should be particularly noticed and looked after, in order to form them into squad or section leaders. Skirmishers must move freely and easily, and always take up a position from which they can best see the enemy, while keeping as far as possible under cover. The rifle should be carried comfortably under the arm or at the trail. They must be practised at getting over and past all kinds of obstacles, and of taking advantage of them as cover. At the same time the recruit must be made to understand, that after all, the direct line is almost invariably the safest, and that in the long run, going any distance out of the way merely entails longer time under fire; thus only a very slight deviation from the direct line is at any time either expedient, or permissible. Loading under varied circumstances and in different positions has great influence in the proper delivery of fire. To deliver fire most effectually against a moving object, while the shooter is lying down, kneeling, or in position behind cover, depends much on the build, development of the body (*Körperbau*), the lie of the land, composition of the opposing objects fired at, and the particular circumstances of the engagement.

In taking cover behind a tree, the right shoulder should be exposed as little as possible. When the tree is a thick one, the left forearm is placed against the tree, so that the rifle is supported in the palm of the hand. When the tree is a thin one, the palm of the left hand is pressed against the tree, and the rifle is now supported between the finger and thumb. Trees give no side protection, therefore a man should always kneel or lie down behind them, and only stand if he could not otherwise see the enemy. When taking cover and firing from behind a parapet, the whole of the left of the body should lean against it; in this position the right foot would be somewhat thrown back and left knee bent. Special instruction should be directed as to the mode of taking cover behind walls, hedges, ditches, and even apparently unimportant risings or inequalities of the ground.

This is best brought home to the recruit by sending out parties, and letting him practically observe how they take cover under all the different circumstances. But never forget to constantly repeat, that taking cover is completely subject to being able to carry out at the same time the most effectual offensive.

Skirmishers, when for the time in close order, must lie down during the fight. If during peace manœuvres sanitary reasons prevent this order being carried out, their officers must point out to the men the reason why, and that in war time they would necessarily have to lie down.

Fifth and Sixth.—Field and garrison service are to be explained only as regards first principles, and to enable the soldier to have some idea of what he would have to do if suddenly called out.

Seventh.—The rest of the initiative instruction hitherto not particularly noted, will be given to the recruits by the lance-corporals, and then by a special non-commissioned officer told off for that duty.

In the second week the musketry non-commissioned officer will instruct as to the cleaning of the rifle.

Eighth.—During the first week, gymnastics and extension motions will take up half an hour in the morning and one hour in the afternoon. After this period the company commandant will decide whether this time could be lessened or not.

Ninth.—The officer in charge of the recruits will always make out in advance a weekly return, showing in the greatest detail how he proposes to take up the following week. Not only must the daily and hourly work be put down, but he must also specify what part he himself will take, and what he intends his non-commissioned officer to take.

Tenth.—From the third week onwards the recruits will do route marching twice a week. While out, there will be plenty of opportunity to go over all that has been taught with reference to skirmishing, taking cover &c., &c.

Eleventh.—Although the recruit may not know how to handle his arm, yet the rifle must be given over to him on the third day. The instructions necessary are to commence in the first week.

Twelfth.—Open order and skirmishing instruction must be driven home into the individual most carefully and patiently, then continued with equal patience and steadiness as the man is successively drilled in file, section, and half-zugs.

Thirteenth.—The instruction in zugs is to be carried out, so that the object detailed in the regulations may be attained, namely, that all movements may be carried out by the men equally well, whether in regular or irregular order.

N. B. Irregular Order.—In the German army the individual soldier has his exact place in the ranks. He has, as far as possible, always the same flank men as well as the same front or rear rank man. It is considered that this greatly adds to his steadiness while under arms. But as such as an arrangement is not always possible, the men are from time to time placed indiscriminately about the line, and this is called "*unrangirten*", or irregular, unarranged order.

The foregoing comprise the general preliminary instructions. They are not so long in the original, for often the numbers only of the Paras.

of the drill regulations &c., are quoted ; but as the books referred to are not perhaps immediately available, all those parts on which the officers in their instruction and drill lay special stress are put down in somewhat greater detail.

Having thus got his colonel's directions, the company commander makes out his proposal for regulating the recruit's course.

The following was the course for the season's recruits belonging to the 9th company.

Training of the individual (*Ausbildung des einzelnen Mannes*).

1st Week.—Uniform, no arms or accoutrements, forage caps.

Drill.—Falling in, in line. Positions at the halt. Moving freely and easily. Turning by numbers. Falling in on fixed points. Going past properly Saluting with the right hand. Easy movements in step. Easy and simple instructions. Extension motions or gymnastics ; consideration of the introduction to the musketry regulations. All this must be practised with each man singly by himself.

Gymnastic Exercises —On the cross bar ; jumping over a rope.

Instruction, theoretical, by Officers.—Duties of a soldier, and military ideas Articles of War. Punishment code and complaints.

Ditto by N. C. Officers.—Organization of the army. Duties. Barrack orders &c. Divisions and parts of the army.

Instruction in loading and firings.

Duties and ideas of a soldier.—One of the first of these is to take the oath, but not until its nature is thoroughly explained.

In Saxony the oath is as follows :—To truly serve His Majesty the King during term of service. To loyally obey His Majesty the Emperor of Germany, and the war regulations, and always to behave as a true and honourable soldier.

This oath is taken before the flag. The latter is always to be pointed out as a symbol of one's country, the remembrance of which in time of greatest danger should nerve the soldier to the utmost.

(This oath brings as its primary duty absolute loyalty to the King and his house ; secondly, energetic striving to prepare for military work as soon as possible ; thirdly, determination to fulfil all duties and to behave with courage before the enemy).

" Pluck and determination to do his duty will make the soldier endure all discomforts in peace time, and also make him brave in battle. Properly directed pluck and determination in battle is courage ; improperly directed it is fool-hardiness. The opposite quality, cowardice, is shameful and dishonourable to a soldier."

Fourthly, obedience to one's superiors, honourable conduct off and on duty, good and upright behaviour towards one's comrades.

The non-commissioned officers' lectures are upon army organization, *i. e.* how the German army is raised and organized ; the duties of a soldier are also continued and exemplified. Rules in the barracks ; composition of the army, with the special object of enabling the soldier at once to answer to what corps d' armee, divison, brigade, regiment, battalion, company, and section he belongs to, and who commands in each case. Handling the rifle.

2nd Week.—Uniform, arms inclusive of side arms. Forage caps.

Drill.—Recapitulation of what was learnt last week. Position in the ranks. Standing at the "shoulder" and the "order". Feeling. Marching singly, hips steady, and by numbers. Marching without step. Double. Stepping forwards, and backwards. Saluting by word of command. Facing, piling, and unpiling arms. This last without any command. Falling in. Forming to the front.

Skirmishing.—Opening out into skirmishing order. Closing. Going through all the skirmishing practices but without arms.

Extension motions.—Continue practices as before. Double. The practices learnt in the last week to be gone through again, but in squads of two or four men. Jumping; extension motions without arms.

Gymnastics.—Continued practice on the cross bar and jumping over a rope.

Musketry training.—Explanation of sights, aiming, firing, targets.

Lecture, theory, by Officers—Military duties and ideas. Articles of War, punishment, and complaints.

Ditto by Non-Commissioned Officers.—Barrack instruction. Organization of the army. Duties. Formation of the army, and its component parts. Putting in order and cleaning clothing.

3rd Week.—Uniform, in the morning, drill order with arms. Afternoon, forage caps, arms, and accoutrements.

Drill.—Recapitulation. Single men marching, keeping the hips steady, marching without step with shouldered arms.

N. B.—This march without step (*marsch ohne tritt*) is our ordinary march, and is thus named in German to distinguish it from the parade march The latter is in the same time, but the foot is more carefully pointed, and is brought down with a stamp on the ground. It is used in marching past, and when any body of men passes by a senior officer, and the word, "eyes left" or "right," is given.

Turning by word of command, individually.

Loading (without filling the magazine)

Skirmishing or extended order, as before, but with arms. Kneeling, lying down, getting up quickly, one by one separately taught to be ready for attack, but not yet by word of command.

Extension motions.—Foot and leg movements (much the same as we now have, particularly what is called the high step.)

Ditto with rifles.—With rifle and both arms.

Gymnastics.—Continuation of last week's work, particularly on the cross bar.

Musketry training.—Recapitulation and aiming from the tripods.

Instruction by Officers.—Continuation of last week's subjects.

Ditto by Non-Commissioned Officers.—Continuation of last week's, and also explaining to the soldier rations, clothing, pay &c , all that he has a right to.

4th Week.—Uniform, drill order with rifle. Afternoon, forage caps, (*i. e.* in the morning helmets are worn).

Drill.—Turning, pacing side-ways and to the front. Dressing back when standing at the shoulder or at the order, each man singly and by numbers and by word of command. Shoulder and order by numbers. Loading when the rifle is at the order (*i. e.* on the word of command to load, the rifle is brought up to loading position &c.), and at the shoulder. Slow march with shouldered arms. Ordinary march without numbers with hips steady. Turning on the march, with arms. By single files, double with the rifle over the right shoulder.

(*N. B.*—Owing to the position of the magazine, there is no trail; the rifle at the double is shouldered on the right shoulder, the left hand keeping the bayonet and the shovel steady).

Skirmishing Order.—As before, but under arms. Also attack (open fire), kneeling and behind a parapet, advancing by rushes.

Extension motions.—Recapitulation.

Physical drill.—In parties of two and four men.

Gymnastics.—Cross bar, jumping over rope, climbing, walking along a mast.

Musketry training.—Position of the individual soldier.

Officer's theoretical—Continuation of last week.

Non-Commissioned Officers'.—Ditto ditto.

5th Week.—Uniform, drill order under arms. Forage caps in the afternoon.

Drill.—Recapitulation. Gymnastics, falling in several men in a line with shouldered and with ordered arms and without numbers. Marching at the shoulder without numbers. Marching to flank with arms shouldered on the right shoulder. Present arms by numbers. By single men,--load, ready, present, fire, load, all by numbers.

Skirmishing.—Recapitulation. Aiming. When under arms, advancing by rushes, kneeling, lying down. Smart rising when under arms. Offensive fire lying down and also with rifle supported.

Extension motions.—Physical drill and gymnastics as before.

Musketry training.—Making ready and placing the rifle in proper position against the shoulder. Pulling the trigger while the rifle is firmly held. Explanation of the mistakes in pulling off.

The Officers and Non-Commissioned Officers—Continue their instruction as before.

6th Week.—Uniform, drill order under arms.

Drill.—Recapitulation, but in squads and not singly. Also the men must feel in properly to one another. Shoulder from the present. Making ready the rifle as a magazine rifle, and using it again as an ordinary single loader. Cease firing by single men and by numbers. March in files.

Skirmishing.—As before. Offensive from behind parapets (way of leaning against a parapet and firing therefrom). Instruction as to fire of skirmishers.

N. B.—The above point is considered most important and runs as follows in the original:—

"The orders for firing must be as short as possible, but must let the men know exactly what they are to do.

They must first indicate the direction, then the mark, the sight to be put up, and lastly the kind of fire to be employed."

For instance, "On the guns crowning that small hill, sights from 800 to 900. Ready. Present. Fire. Load."

Or,—"The skirmishers straight before you. Sights 500". Cease fire, (or when the word of command cannot be heard, then a whistle is the signal).

N. B.—The whistle is let into the hilt of the sword.

Then if necessary, the fire may be continued as before, or the sights changed or merely a direction given to fire above the head or below the feet.

Extension motions.—Physical drill and gymnastics as before, except that now in the latter course jumping has to be practised with the alternate feet in front at the take off.

N. B.—A short run of three paces, and then jump from a small spring board is the ordinary practice.

Musketry training.—Carried on as before, with addition of taking up his firing position, standing by himself, and without being told.

Lectures by Officers and Non-Commissioned Officers.—As before.

7th Week.—Uniform, drill order under arms.

Drill.—Practising in squads of 4 to 6 men what has already been learnt. Fixing and unfixing bayonets by numbers. Charge bayonets.

Unloading rifle and magazine. Facing when fallen in in sections, by word of command. Marching in sections.

Skirmishing.—Recapitulation. Instruction as to description of fire and the reasons why and wherefore. Again here much attention is paid. The general scope of the remarks is, "The rapidity of fire is governed by the necessities of the engagement, the kind of object fired at, and the ammunition in hand or obtainable. Bad light and smoke greatly militate against successful shooting. When the mark fired at lies low and is within average distance the fire should be slow. Rapid fire as a rule should only be employed at short distances and against marks only visible for a short time. Volley firing keeps the men best in hand, enables the effect to be better seen, and the distance, if necessary, to be easily corrected. But the noise of battle will rarely allow the voice to be heard, even when the ranks are closed, while it is completely impossible when the men are in extended order. Therefore this fire is restricted to the beginning of the action or only to occasions when the troops are not themselves under heavy fire. The fire of a skirmishing line is usually independent. This ought really to be most effectual, as each man takes his own time and fires when he can see best. The leader or commander of the skirmishers can either by word of command or whistling order a more rapid, a slower, or magazine fire. As a rule, the front and rear rank men composing a file in a line of skirmishers do not fire together. One watches the effect of the shot and loads, while the other fires. But when the word is passed for rapid fire, then both shoot away, as well, and as fast as they can, independently of one another."

Extension motions.—Physical drill and gymnastics as before.

Musketry training.—Pulling off the trigger with the rifle lying on some firm support.

Officers' and Non-Commissioned Officers' Lecture.—As before.

TRAINING IN THE RANKS.

8th Week.—Uniform, drill order under arms.

Drill.—Gymnastics. Parade march by 1 and 2 men at a time, and files, all with arms. Double with squads of 3 and 4 men or files, in single and double rank. Turning at the halt and on the march. Facing to the front and rear, and side steps in rank and squads. Loading, ready, present, fire, unloading in ranks.

Skirmishing.—Movements of all kinds; offensive firing in groups.

Extension motions.—Physical drill and gymnastics as before.

Musketry instruction.—As before, but firing with practice ammunition.

Officer's lecture.—Duties of the soldier. Knowledge of handling and working of the rifle.

Non-Commissioned Officer's lecture.—As before.

9th Week.—Uniform, drill order under arms.

Drill.—Dressing upon points (on markers.) Eyes left. Dressing in files and ranks when in half zugs and zugs. March of several men as in file. Parade march in half zugs, in single and double rank. Firing exercise by word of command. Loading on the march. Doubling by ranks; ready at the kneel, halt.

Skirmishing.—Recapitulation. Movements with half zugs in open order. Reinforcing the firing line.

Extension motions.—Physical drill and gymnastics. A recapitulation of all done in the past eight weeks.

Musketry training.—Recapitulation of modes of firing. Notice of all the mistakes made.

Officers, instruction by.—As last week, with addition of musketry.

Non-Commissioned Officers, instruction by.—After a careful examination the company commander will determine how many hours lectures must still be delivered on each subject.

10th Week.—Uniform, drill order under arms.

Drill.—Practising all hitherto learnt in zugs. Dressing by files in half zugs and zugs. Parade march in zugs. Parade march at the double, in zugs, advancing and retiring in line. Manner of charging in line by zug. Forming. Moving off in column and sections.

Skirmishing.—Recapitulation. The whole zug in skirmishing order. Instruction as to the reinforcement of troops.

Gymnastics.—Recapitulation of the whole nine weeks work.

Musketry training.—Recapitulation. Target practice.

Officer's instruction.—As last week, and in addition, history of the regiment. Theory of musketry. Working of the rifle.

Non-Commissioned Officers.—As the company commander may order after last week's examination.

TRAINING IN ZUGS.

11th Week.—Uniform, drill order under arms.

Drill.—Recapitulation of every thing in zugs. Doubling in sections and wheeling. Firing. Forming into line from column, and forming to the front from file. Wheeling by sections, and moving in sections, changing direction.

Skirmishing.—Firing with blank ammunition.

Gymnastics.—Recapitulation.

Musketry.—Recapitulation, and ball practice (6 shots).

Officers, instruction by.—Generally about the rifle, and also field and garrison service.

Non-Commissioned Officer's lecture.—As last week.

12th Week.—Uniform, drill order under arms. Two days in the week boots suitable for the inspection day to be worn. On one day the parade helmet, and on one day the best accoutrements.

Drill.—The drill to be recapitulation of all done before.

Skirmishing.—In zugs.

All the rest, musketry training, gymnastics, and lectures, a general working up of every thing for the inspection to take place in the next week.

Generally the battalion commander will inspect the recruits.

CHAPTER II.

On the completion of the instruction detailed in Chapter I, the recruits fall in with the company, and all go through their drill together.

The Captain takes the company in hand, and has to drill them and put them through their musketry as well as a course of company training similar to ours Much importance is now attached to taking them out into the country, and minutely explaining the reason for positions and duties of sentries, outposts, advanced and rear guards &c. For this part nothing seems too insignificant to notice.

For instance, when kneeling behind a tree, the soldier is taught to stand up against it, and then kneel, thus leaving his knee pressed up against the tree. He then leans forward, so as to get his left arm also against the tree and form a rest. By this means he is best protected, and can rise to a standing position with least chance of exposure.

Bringing in reports is constantly practised. The instructor who is with the advanced party, takes one man after another, gives each *vivâ voce* reports of all kinds, to take back to the Captain in the rear. This report the man has to give in a loud clear tone, and be able besides to answer any questions that may be asked about it. For instance :—No. 1 comes in with the report that guns have been heard in the distance, and that three mounted men have come out of the wood 1000 yards away, and seem to be watching. Questions asked :—Does the artillery fire appear to be stationary, advancing, retiring, increasing, or diminishing? Answer (in this case), Stationary and diminishing. *Q.* What do you make out about the mounted men? *A.* They appear to be sent out ahead for information. They do not appear to have any other party coming after them, as they neither look back nor send back. As they did not seem to have discovered our advanced sentries, the latter kept quiet and sent back for orders.

Report :—A party have come up, and placed vedettes round them. The party is not large but they seem to have taken up a fixed position.

Q.—What do you infer from that?

A.—That they have a strong force behind them, as they soon saw our sentries and yet quietly kept their posts. They are also constantly sending backwards and forwards.

At first the reports brought in were, many of them, badly rendered and unintelligible, but the mistakes were at once pointed out, and the object explained; and in a few days the reports were given and the questions answered with a precision, smartness, and clearness, totally unexpected by any one who has not watched a similar process of education.

When double sentries are out in the front of an army and they see the enemy, they are taught not to fire at once, but to consider whether it is correct for them to thereby discover their position. If they decide in the affirmative, they are to consider how distant the enemy is, taking into consideration whether the sun is before or behind, high or low, and the weather. The two or three simple rules necessary for that are learnt by heart by every soldier, and he repeats them straight off whenever he is asked, and so gets them driven deeper and deeper into his mind. Lastly, while one sentry fires, the other marks the shot. The piquet is alarmed etc., etc.

Frames of paper, of different colours, instead of flags, represent cavalry and infantry, and are used at nearly every parade. The cavalry marks are generally carried by mounted men, who move sharply backwards and forwards, and so enable the company commander to illustrate the reasons of the various kinds of fire, *i. e.* volley, independent, and magazine.

The companies after a time fall in together for battalion drill. Here, besides ordinary drill, they are exercised company against company, or the whole battalion against a marked enemy. At the beginning of the parade the officers are called together, and told what they are to do. At the end of every complete movement, they are recalled, and their doings most minutely criticised. All that has been gone through in zugs and companies is repeated in the battalion.

This together with the musketry course takes up every spare hour, until the time comes for the Colonel's inspection, which usually takes place at the end of May or beginning of June. Each battalion is inspected separately on different days, but all the officers of the regiment attend. As a rule the General of the division and the Brigadier are both present.

The companies are drawn up separately. The Colonel, as he comes, interchanges with his men the usual '*Hoch*,' and inspects the line; while doing so he keeps examining and cross-questioning man after man much as follows:—Who is your Captain, and what is his name? your Brigadier-General? Corporal, Sergeant-Major, division, brigade, regiment, battalion, company, zug? What ration do you get? What clothes? What is your term of service, etc., etc.? I never heard a man hesitate, or give a wrong answer. The object of all this being, that in case any part of the army was momentarily broken up, the remaining component parts may reform again as rapidly as possible. Naturally, nothing could so well conduce to such a result, as that each individual should know his exact place.

The company then goes through every movement the men have learnt during their course of instruction. *Each* and *every* man goes past singly, and in files, at the slow, quick, and double. Gymnastics, jumping &c., in fact, everything is done. Next the company forms up on parade for company drill, manual and firing, and last in battalion for marching past. Of manual there is very little else but the slope, present arms, order, and, at special times, fix bayonets.

The magazine interferes with the trail, therefore at the double the rifle is carried at the slope, but over the right shoulder. It is a beautiful sight to see the slope from the order, the precision with which it is placed over the shoulder and its rigidity when once there. It is now when seeing the battalion together, that one can thoroughly appreciate the very successful result of the preliminary drills. The movements are perfect in their time and stability, indeed they now reach their culminating point as far as precise drill is concerned, for they afterwards fall off a little, owing to so much more attention being paid to practical field tactics &c.

During the early summer months inspections come on frequently, while at the same time the Colonel seizes every opportunity to drill the men together and take them out for field exercise.

Route marching also is well kept up, the knapsacks being fully weighted, and the marches prolonged day by day.

All the principal inspections are alike, except that the higher the rank of the inspecting officer, the *somewhat* less he goes into detail. I shall therefore take H. M. the King of Saxony's inspection as an example of the whole, especially as he not only is King, but is considered as one of the very best generals the Germans have ever had. He is the one to whom Moltke paid the very great compliment of saying 'That H. M. was a general who had never made a mistake.'

The grand parade ground where the inspection took place is about a couple of miles away from the barracks. It is some miles in extent, and diversified by small hills and undulations with patches of pinewood coming in here and there, so that all sorts of different manœuvres can be practised by even large bodies of troops.

The regiment was drawn up in *Breit Kolonne*, *i. e.* line of company columns (each company in column of its three zugs). All the generals and staff officers belonging to head-quarters and the division, who were not actually with the King, fell in on the right of the line (and joined his staff on his beginning to ride down the line). When the King approached, the Colonel gave the word to present arms, and the band played their national anthem, the air of which by-the-bye is the same as our own, "God save the Queen." The King then came up and greeted the men as usual. He then rode slowly down the line, evidently taking careful note of everything. As soon as he had passed, the regiment formed up for drill movements, in the performance of which it gradually got towards the south side of the ground. On its arrival there, the Brigadier called out the Colonel, and gave him an '*Aufgabe*' (*i. e.* a military problem) as follows:—

The regiment was to move forward, and force back an enemy that was advancing and would be met some two miles away. Part of the ground to be traversed was exposed to artillery fire. Beyond was a defile (between a small hill and a bit of thick wood), going through which no enemy was to be expected, but soon after the latter they were to come in sight.

The movement was carried out as follows. The regiment marched off in line of battalion columns at company deploying interval. As they approached the ground exposed to the enemy's artillery fire, each company formed line, and thus the whole regiment marched across the dangerous ground in four lines. Getting into the shelter of the wood, battalion columns were reformed. I think the defile was broad enough to pass through in zugs; if not, then the zugs were wheeled into sections. An advanced party was sent through, but there were no flankers, it being supposed to have been previously reconnoitred, and to be free from any enemy. The latter were discovered about 800 yards beyond the defile, and on ground lying at a lower level.

The attack being much the stronger, they advanced by rushes, seeking to outflank the enemy's right. To meet this movement the latter drew back their opposing flank. Soon afterwards the offensive approached within distance, and began pouring in a heavy magazine fire to prepare for the charge. At this moment the cease fire sounded. The officers then all assembled together to hear the Brigadier-General's criticism. He took at least a quarter of an hour going through the whole, although he had no fault to find, and but little to differ from. As soon as he had done, the King took his turn, and at once pitched upon the only mistake made, and which even the Brigadier, a very well known and smart officer, had let pass. It was this:—

The enemy resisting strongly, rushes were made up to charging distance, and then a very heavy magazine fire poured in preparatory to the final charge. At that time the attacking party had of course formed up together. But they all still kept to a line parallel to that of their start, while the enemy had before refused their right in order to avoid being outflanked, so the left attack was much further from the enemy than the right attack and in consequence too far to charge effectually.

With this movement the inspection of the regiment was completed, and the King went off to the 2nd Regiment of Leib Grenadiers. Altogether the parade lasted about 2½ to 3 hours for each regiment.

Sometime in every season each officer is given a special *Aufgabe*. For instance one of the Captains had the following set to him:—

The enemy are in full retreat away from Dresden by way of Schandau. There are, however, still a couple of companies in the village of Radeberg, who are protecting the last of the commissariat and transport. They will not move till 6 A. M. (I forget the exact time, but it was such that the pursuing party might just arrive while the retreating force was on the move out of the village). Attack, and do all the damage you can. Strength of attacking force, one battalion, and about 50 cavalry to act as scouts.

This party was all ready when the above order come. The Captain at once took out his map, and having determined on his plan, rapidly wrote down his orders, sending a copy to the Colonel who set the problem. Now Radeberg is situated about 9 miles away on the other side of the Dresdener Heide, a pine-tree forest bordering the north-east of Dresden. There were two roads by which the village could be reached, one 9 miles long and direct, the other somewhat circling to the right, 11 miles, and debouching about ¾ mile beyond on to the road the retreat would have to follow.

The orders were to attack, but also to do as much damage as possible. It was evident, that to catch the enemy on the road with his force extended in protection of his convoy, would carry out the instructions most favourably. Or, should the enemy be still in the village, cutting of his line of retreat and attacking from that side would cause them to be completely destroyed and all their impedimenta taken.

But, had the bulk of the enemy so far retreated, that they could not send back help in time? Or would the enemy by means of his scouts find out the direction of the intended attack, and make use of the delay caused by the longer march to escape sharp beyond the threatened point? In which latter case the two escorting companies could easily fight a retreating action without much damage to themselves, and so far delay the attack as to allow the carts &c. to get away without damage or loss. Certainly, though a direct attack might succeed, it could not do so without considerable delay, for the enemy had been in the village the day before, and by 9 A. M. on the day of attack could easily have made full preparations for resistance.

Taking all the above into consideration, the longest way was determined on, and the scouts sent on had special orders to keep themselves carefully under cover and out of sight of the enemy. When about 6 miles on the march, a note came from the Colonel to say that a whole regiment of the enemy was retreating along the heights about two miles from Radeberg. Now came the question:—Would the regiment have marched far enough away to prevent them sending help back when the time came for the attack to be delivered, or would the enemy's scouts find out the proposed line of attack sufficiently quickly to bring back reinforcements. In either case, things turning out unfavourably, the proposed attack could not but fail.

There was still the chance of operating direct, and so attacking from a point farthest away from the line of possible reinforcements, and there was this advantage in it, that the offensive force would debouch from the forest at a short distance from the village. But for the reasons before given, a direct attack promised little advantage, and so trusting to not being discovered and the enemy's regiment moving on, the officer commanding the attack made up his mind to persevere in his original plan; all, however, went against him, the enemy's scouts were too sharp, and the regiment had not marched off.

The Colonel's decision was that the movement had failed. That the essential part of the order was that the village should be attacked.

I think myself, that from the moment the above regiment was declared to be still on the heights within two miles of Radeberg, the attack was bound to fail. Not only could the enemy get reinforcements, but also it emboldened their two companies to defend the village, especially as the latter was of a nature that could be rapidly put in a strong state of defence. A railway on high embankments ran close by. Towards the line of direct attack were two manufactories with out-houses and courtyard walls. Timber was lying about, so that half-an-hour's notice would have been sufficient to make the buildings &c. very strong. Other parts could in the same way have been easily held more than long enough to enable reinforcements to come up.

CHAPTER III.

Field Firing.

The field firing is carried out in as practical manner as it is possible for any thing of the kind to be. The general aspect of the ground was as follows:—Long easy-gradient hills, of which the highest points and outlying small spurs were mostly covered with pinewoods. All the rest cultivated, the greater part crops growing or standing, but also a fair proportion of land lying fallow or already ploughed up for next season's crops.

Three positions had been chosen, each hidden from the other by the hills, undulations of the ground, and woods. Trenches had been dug over a considerable area. The targets were the usual $\frac{1}{4}$, $\frac{1}{2}$, and full figures, mounted on long beams of wood. In the centre of the beam is a simple handle or stick about 3 feet long, by means of which the targets could be raised or lowered. The targets for the cavalry were proportionately larger. The artillery were represented by white cloth targets (not movable). To manage the infantry and cavalry targets, holes were dug about 4 feet deep and sufficiently large for a man to sit in. Overhead was a bullet proof pent roof rising 3 feet to the rear, giving the man inside complete protection, and enabling him from his seat easily and rapidly to move the targets into and out of sight. To allow the men sitting in these trenches to know when to manipulate the targets, a non-commissioned officer sits in a similar hole behind the marked position, and somewhat out of the line of fire. He observes by means of a looking-glass signals made to him by the officer superintending the operations, and in his turn puts up the necessary signals to the men in their trenches.

Having the target under control in this way, and the trenches dug over and along a considerable space, the idea of cavalry and infantry advancing or retiring can be given with the greatest effect (further on I give instances). The artillery when coming into action were imitated by small rockets or firework discharges sufficient to make a sound and show smoke. The positions from the 1st trench to the hindermost gun were from 800 to 1000 metres in depth. Every battalion took one day for its field practice. The Colonel gave each Captain his problem to carry out, and the battalion commander gave the Lieutenants their work. For instance to a Captain,—You have taken the village and are coming out in pursuit. The enemy have, however, taken up a position and they have cavalry on your left front.

Action.—The Captain first turned his attention to the cavalry, firing several volleys by word of command. Having dispersed them, he advanced about 100 yards, until just over the brow of the hill he discovered infantry lying down. Upon these he advanced rapidly by half-company rushes.

Criticism by the Colonel,—Volley firing at the cavalry was correct, but there was no necessity for so few cavalry to take up the attention of the whole of the company. Part should have kept the cavalry off, while the rest should have pursued the retreating infantry as soon as possible. Then again the method of attack was correct, but too rapidly executed, the men were quite breathless before the time came for the charge.

The General commanding the division, who was present, approved of these remarks.

2.—For another Captain. The enemy are in retreat, but are strong in cavalry and have some guns in position. Do them as much damage as possible.

There the idea was, that the enemy might turn, and the attacking party have to get out of it as best they could.

The company were allowed to get up to within a couple of hundred yards of the front trenches, then suddenly the enemy appeared in the further trench, and advanced by alternate rushes. For this purpose full length targets were put up and down alternately for a few seconds at the proper trenches. Cavalry also appeared, and a retreating fight was kept up till reinforcements were supposed to come, and the enemy again resumed his retreat.

3.—The enemy, leaving a small force to protect the defile, are in full retreat. Clear out the defile, but beware of their cavalry.

4.—The enemy are advancing. Their force is stronger than yours, but you must do all you can to delay their advance.

Here again the Captain to whom this order was given, had to begin from somewhere in the middle of the position.

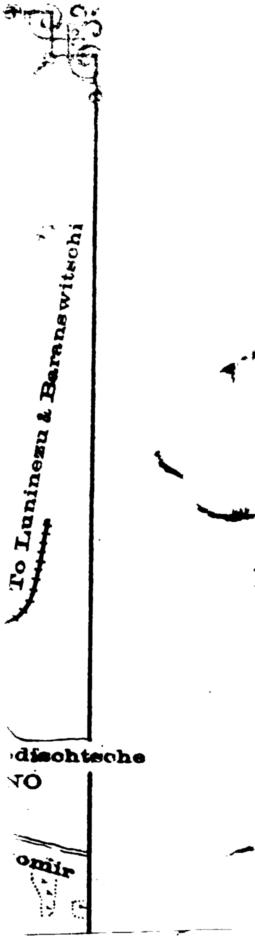
To the Lieutenants less important problems are given, as:—

1.—Take half a company, and protect the flank of the column against cavalry.

2.—You have just rushed a party of the enemy through the village. Pursue them.

N. B.—In this case he was suddenly met by cavalry from the left.

During the whole day everything possible was against good shooting. The weather was very damp, in fact a little rain fell from time to time, a haze kept clinging to the ground, the ground was too wet to show when a bullet struck, and the smoke would not rise. Consequently the distances were almost always over-judged by about a sixth, while for the reason above stated no correction could be made. Therefore, though I quote some of the hit returns, yet I do not consider them a criterion of the shooting, but rather as an example of how much the weather can affect shooting. At 800 metres (866 yards) only one per cent struck the artillery (2 guns). At 500 metres six per cent struck kneeling infantry. At 400 metres 14 per cent struck cavalry. Another time at infantry lying down at 400 metres 3½ per cent only struck. At a retreating battalion column in close order, distance 500 metres, 25 per cent struck. It must also be remembered, that the targets were not always in view, but



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suddenly appeared and disappeared from unknown directions and uncertain times, so that it was as impossible for an officer to know from where the next enemy would appear as when shooting pigeons from a trap. The officer superintending the whole can put up the targets where he likes, and thus quite change the movement even when actually in progress.

The grand manœuvres in Saxony were not of very great importance this year, and I therefore only notice those in which smokeless powder was used. On the day when the General commanding the division set the problem to the Brigadier under him, the attacking force used it, while the defensive force had the ordinary powder, which enabled the two to be compared.

Order issued by the Lieut.-General:—The division, marching by Gruckelsberg—Flöhé, hears at 9 A. M. the guns of the corps d'armée advancing by a parallel route through Mülbock, and will then advance to engage the enemy and co-operate with the above forces.

On receipt of the above the division, which till then had marched in ordinary column of route, at once moved out its scouts and advanced guard, which soon met signs of the enemy by finding the bridge across the streams at Flöhé in the possession of one of their detachments. To drive them out a force was sent from the advanced guard. The attack began by lining the river right and left of the bridge and overpowering the defenders' fire. As soon as the latter retired, the attack took possession and crossed.

The defenders afterwards made but slight resistance, in fact did little else but keep touch of the advance, until their ultimate position was reached. The offensive scouted and examined everything as they went on, notice being continually sent back to the Brigadier-General.

I was much struck by the way in which these reports were delivered. There was no hesitation in what had to be said, but the whole was rolled straight off, as if by a machine. When an order was given to an orderly for him to carry on to any one else, he as a matter of course at once repeated it in the usual mechanical loud tone, and then started away straight to deliver it. The consequence is, that the eventual recipient of the order gets it as it was given, and confidently sets about its fulfilment.

Now and then in the details of the movements some mistakes *do* occur, as for instance,—A troop of the enemy's cavalry passing at a walk along the high road from one wood to another for a distance of about 600 yards, while in full view of two of their opponents' companies, which were all the time firing volley after volley at them at 500 yards.

About 10-30 A. M. it was ascertained that the defenders were posted on the heights near Ebersdorf and opposite Brausdorf, the high road in front of Ebersdorf lying almost parallel and a little in rear of their general front; the right and centre being stationed close on the brow of the inclines on the right front of Ebersdorf. The left, somewhat thrown back, blocked the angle made by the road from Chemnitz meeting the Wiesa-Lichtenau road. Here there were two or three farm buildings with hedges about them, also a few big trees, besides those lining the road, so that the position might be considered a fairly strong one. The defect was a gap between the left and centre. In general the defenders occupied high ground, from which easy open slopes, ran straight away for an average of 700 to 800 yards, which at the centre pushed out across the railway for another 500 or 600 yards. Up to the line thus indicated, rather thick pine and other woods gave the offensive infantry full cover, and enabled them to make their movements in comparative safety. The action began by the offensive artillery opening fire from the slopes above Brausdorf, which was of course immediately responded to by that of the defence. During the artillery duel the offensive infantry developed a strong attack on the defensive left, a fairly strong one direct on the centre, together with an attempt to outflank the defensive right. To meet this latter attack the defensive refused its right a little, strengthened it, and stationed the cavalry on that side to counter-threaten the advance.

While the right attack was proceeding, a battery was brought up from Brausdorf, and coming up by the high road to the edge of the wood from which the right infantry attack had debouched, they unlimbered while yet under cover of the wood, and assisted the right attack by their fire.

In the meanwhile the left and centre infantry attack advanced by alternate rushes, taking advantage of lines of small sharp declivities, of which there were several running at right angles to the general line of advance, to concentrate for the next rush.

The right attack supported by the guns soon succeeded, and the infantry on the other side having almost closed up, the cease fire sounded.

The wind was very high, and as I could not get near the Lieutenant-General owing to being mounted on a vicious horse, I unfortunately could not hear his remarks, but it appeared to me that the centre attack was somewhat rash, and that these lines of steep accidental short slopes lent the centre attack its only excuse for continued advance. These little sharp abrupt falls are often found in continuous slopes, and it is remarkable how much cover they can give to considerable bodies of men lying down. On the right the attack was delivered under more easy conditions and supported by their guns. There also it seems to me that the attack should have been specially strong, so that when half way between the wood and the defenders' left they might have taken advantage of being completely on the flank and within 600 yards of defenders' centre, and turned part of their fire on the defenders' centre. At the same time they could have been further aided by, say, four of the guns in the wood. Under such an enfilading fire the defenders' centre must have retired from the brow of the hill, and the centre attack could have been delivered with little loss.

No doubt the Lieutenant-General noticed all this. Nothing seems to escape them in their criticisms, as might be expected when they are trained to it from the very beginning of their service. They not only have to think over what is being done, but are obliged to *speak out* their opinion on parade. Still the manœuvre of the day was of no special importance to outsiders, except as regards the so-called smokeless powder; I say so-called, because there was a little smoke, though I am assured that the elements of smoke, even to the limited extent I saw, no longer exist in the last make of powder, but that enough had not been got ready to enable it to be issued for practice purposes. What I saw gave very little smoke and made very little noise, a gun for instance only showing about the same quantity of smoke that a rifle does when fired with ordinary powder. Even that amount dissolves as rapidly as would thin steam, so that a body of infantry might empty their magazines in volleys against cavalry without being in the least hindered by their own smoke. Lastly the noise of a gun discharge has more the sound of a sharp crack than the deep roar we are accustomed to, and I could hardly hear them firing when two kilometres distant. Thus apparently nothing at all would be heard at 3,000 yards.

The noise and smoke of battle no doubt tend greatly to encourage and excite the combatants. Without smoke and without noise it will be quite a new sensation to face an enemy, whose presence you only know of by the sound of their shot passing by and the sight of one's own dead and wounded.

Fortunately the coolness and dogged pluck of the British soldier will here again bring him well to the front as compared to other nations, while as to our native sepoys their unbounded faith in *kismet* is a most fortunate circumstance to work on. Again too, how will it affect cavalry? The infantry will no longer be impeded by the smoke of his own rifle, but the horse will no longer be stopped by the smoke and the noise, and desperate charges *might* succeed. Looking on at the manœuvres last described, I could not help thinking we are indeed on the eve of a most important departure in the science of warfare.

Lastly, amongst things to be noticed and which appear to be of great advantage, I again advert to the invariable criticism delivered by the senior officers present after every movement. It so thoroughly trains an officer to observe everything, gives him confidence in forming, delivering, and carrying out his opinion. And not only that, but it gives a very necessary practice in the art of enunciating it in intelligible language, and last though not least, in proper sequence. With us, many officers, most probably a large proportion, if asked to do so, would for want of practice, hesitate, be nervous &c., in short, be quite unable to speak out clearly, although really quite as competent to criticise as the best of German officers.

To prevent manœuvres being worked out in a regular cut and dry system has always been a difficulty. During war the element of chance is a considerable factor in all results, and how to bring it fairly into the conditions of peace manœuvres is a great puzzle. One method is by sudden changes, previously decided upon by the officer directing the operation; this is good but not sufficient, for I think that sometimes hazardous movements might be granted success. There is no history of a war which does not contain numerous examples of how at times the most dangerous strokes have been successful, while through some unforeseen accident the best planned ones have failed. Perhaps therefore, if it were settled upon, that any movements carried out at a certain time by either of the opposing parties should in spite of probabilities, have success, such unexpected situations would be created, as to call forth the best energies of both parties, and more closely resemble the vicissitudes of war.

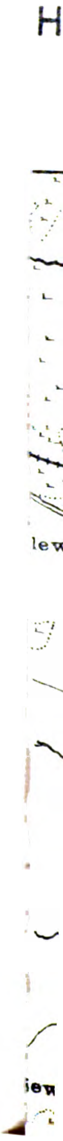
Most of the drill &c., is in detail the same as ours, or perhaps more correctly, our drill is like theirs, but I think in the minutiæ there are things useful; for instance, when practising doubling the recruit is ordered to do so without noise, thereby obliging the man to move on the front of his foot. The leg is strengthened and the pace lengthened. The Germans say that when the full knapsack is carried, the pace will be shortened fast enough. When bringing the hands to the side after unfixing bayonets, it is done in the man's own time and not taking the time from the right or left, as it makes the men stretch forward to try and get sight of the flank man, and so looks bad. They dress back and not up, and tell the men to observe the position of the feet so as to get well into line. When a battalion marching to the rear, gets the command "battalion halt", the men swing round to the front on the left foot, and halt. This movement has a smart and effective appearance. When a column forms into line and some files happen to be out, the latter have to distribute themselves about the company wherever they can find an opening. They must not remain useless behind. The rifle has on the whole, about the same pull-off as ours, but the action is different. We try to steady our men and prevent shooting off too rapidly by the weight of the pull-off. They do so by the length of the same. The trigger has an small intermediate catch, and after this is reached a further light press is all that is required to fire off the rifle. By the long pull the man gets steady, while the light remaining pull does not disturb his aim.

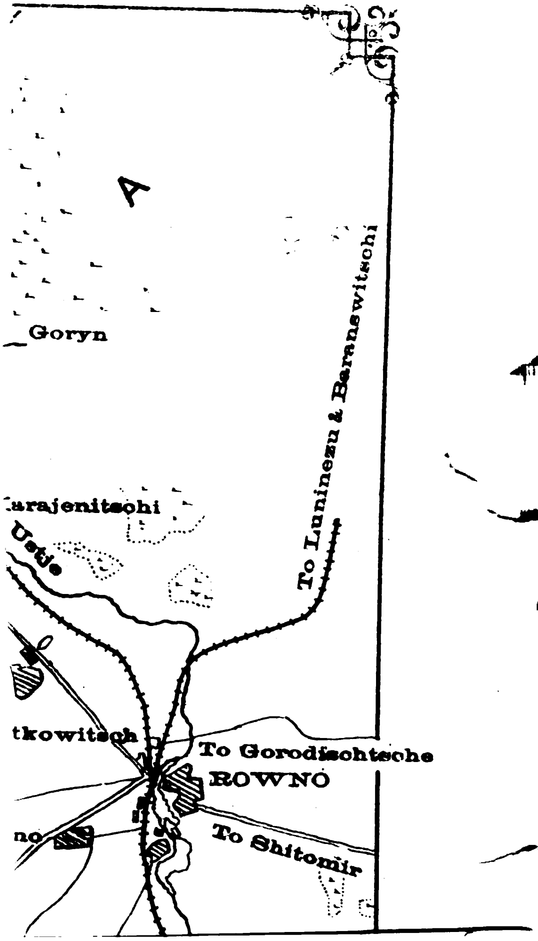
In the foregoing some reference is made now and then to different parts of the regiment, so I here note its composition :—

The regiment has three battalions, and is commanded by a Colonel with a Lieutenant-Colonel under him.

Each battalion is commanded by a Major. In every battalion are four companies, who have each one Captain, one 1st, and one 2nd Lieutenant.

The companies are divided into three zugs. Each zug may be formed into half zugs or into sections. The latter (sections) must not be of more than six or less than four men.





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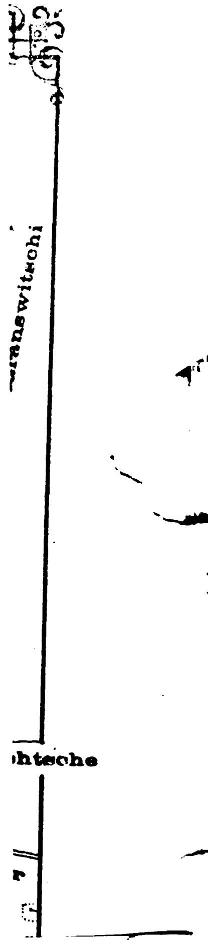

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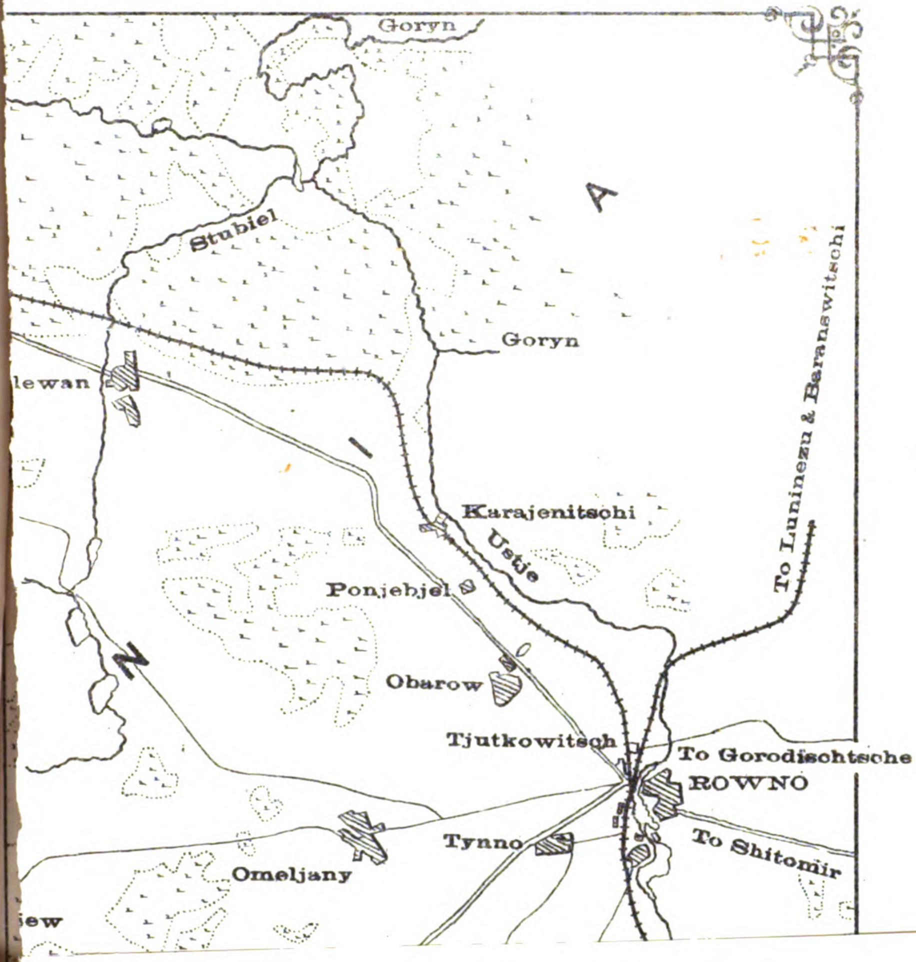

To illustrate translation
"Russian manœuvres in Volhynia, 1889,"
by Lieutenant A. R. Browne,
in Journal No. 87 of 1891, to face page 281.

THE RUSSIAN MANŒUVRES IN VOLHYNIA IN SEPTEMBER 1890.

Translated from the *Militär Wochenblatt*, No. 3, of 1891, by Lieutenant A. R. BROWNE, 2nd Battalion Border Regiment.

The extensive manœuvres arranged by the Russian War Department in the western division of the province of Volhynia in September 1890 shed a new light on the subject of the training of troops.

Although indeed in previous years (in 1888 at Jelissawetgrad, in 1889 at Ostrolenska) concentrations of troops had been held, which exceeded the confinement of corps manœuvres in defined limits, still it was in 1890 that the experiment was first tried of allowing two armies (*i. e.* a concentration of several army corps) to operate against each other.

An article in the *Invalide* of the 7th September 1890 outlined the object of the manœuvres as being to give the chief leaders practice in the handling of masses, with reference to the ordering of marches and interior economy, as much as in the leadership of troops in battle.

The troops detailed to take part in the Volhynian manœuvres belonged to the military districts of Warsaw and Kief, and were organized as two forces, designated the Volhynian and Lublin armies respectively. Their constitution was as follows:—

The Lublin Army.

Commander-in-Chief, General of Cavalry Gourko.
Chief of the Staff, Major-General Pusyrewski.
Quarter Master General, Colonel Sacharoff.
Commanding the Cavalry, Major-General the Grand Duke Nicolai Nicolaiewitch the Younger.

	Infantry Battalions.	Cavalry Squadrons.	Artillery Guns.	Technical Troops Battalions
14th Army Corps.				
17th and 18th Infantry Divisions. 1 Brigade of 14th Cavy. Divn.	32	12	90	
15th Army Corps.				
2nd and 8th Infantry Divisions. 13th Cavalry Division.	32	23	84	
32nd Infantry Division, attached from 11th Army Corps	16		24	
3rd Infy. Division of the Guard	16		24	
1 Don-Cossack Division		24	12	
3rd Brigade of the 2nd Guard Cavalry Division		12	6	
1 Sotnia of Kuban-Cossacks (Convoy Troops)		1		
2nd Field Police Squadron		1		
3 Sotnias of Mounted Frontier Guards		3		
1st and 2nd Batteries of the 2nd Field Artillery Regiment			12	
8th and 9th Pioneer Battalions				2
3rd Supply-Train Corps				1
Totals	96	76	252	3

and also the 11th and 12th Military Telegraph Parks, giving a total altogether in round numbers of 2,600 officers, 63,000 men, and 14,000 horses.

The Volhynian Army.

Commander-in-Chief......Lieut.-General Dragomiroff.
Chief of the Staff.........Major-General Malama.
Quarter Master General..Colonel Schimanowski.
Commander of the Cavalry...Lieut.-General Strukoff.

9th Army Corps.	Infantry Battalions.	Cavalry Squadrons.	Artillery Guns.	Technical Troops Battalions.
5th and 33rd Infantry Divisions...	31		48	
12th Army Corps.				
12th and 19th Infantry Divisions 12th Cavalry Division ...	32	24	84	
11th Infantry and 11th Cavalry Divisions (attached from 11th Army Corps)	16	24	60	
Mixed Infantry Division consisting of :— 3rd Rifle Brigade = 8 Battalions 40th Reserve Infy. Regt = 2 „ 41st „ „ „ = 1 „	11			
2nd mixed Cossack Division........		24	12	
3rd Sotnia of the 1st Ural Cossack Regt. (Convoy Troops)........		1		
3rd Field Police Squadron..........		1		
3rd and 4th Batteries of the 2nd Field Artillery Regiment....			12	
5th and 6th Sapper Battalions......				2
3rd and 4th Railway Battalions....				2
4th Supply-Train Corps.............				1
Totals...	90	74	216	5

and also the 7th and 9th Military Telegraph Parks, bringing up the strength of the Volhynian army to 2,300 officers, 59,000 men, and 14,000 horses.

On the parade at Rovno on the last day of the manœuvres, the 14th September, there were, according to the *Invalide*, 4,178 officers, 120,705 men, and 26,006 horses.

Opposed to the above figures was a statement in the papers that all the remaining troops belonging to the Warsaw and Kief military districts had taken part in the manœuvres, but acting independently. These were as a matter of fact not called upon, though available. Their strength was :—From the Warsaw district, 100 Battalions, 62 Squadrons, 218 Guns, 23 Battalions of Technical Troops. From the Kief district, 45 Battalions, 47 Squadrons, 110 guns, and 5 Battalions of Technical Troops.

As the Russian infantry divisions have no divisional cavalry, a proportion had to be assigned to them, and this was carried out in varying methods in the two armies. General Gourko split up the 1st Don-

Cossack division, and apportioned one Cossack regiment of six sotnias to each of the four columns (see below) in which he made his advance; the two horse artillery batteries of the division were handed over to the 32nd infantry division.

General Dragomiroff asssigned only one Cossack regiment from each of his three cavalry divisions as corps cavalry to the 9th and 12th army corps, and the third (in addition) was divided between the two independent (infantry) divisions

The *Invalide* of the 7th September made the following remarks on the plan of the manœuvres:—"In order to make the manœuvres as instructive as possible, they will be carried out according to a preconcerted plan, which will lay down directions for each day. This primary enactment will give the Commanders-in-Chief the opportunity of carefully watching the actions of the subordinate leaders and their staffs; they will then minutely examine the results of those actions, and will thus deduce from each day of the manœuvres the most useful lessons for the troops. To this end, and to allow of comparison between the observations made by the Commanders-in-Chief, and points personally noted by the leaders of army corps, a day's rest is arranged for after each general action. In addition each day is to be divided into two portions, the first from 7 A. M. till 12 noon, and the second from 2 P. M. to 4 P. M., the interval being devoted to rest. This division is laid down so that order may be restored, and that over eager troops may be stayed; and, moreover, by this provision, the use of signals after the fixed hour, which, owing to the wide extension of masses of troops, would hardly be practicable, will become unnecessary. Lastly, the umpires are warned not to allow infantry to march more than 30 (nearly 20 miles) or cavalry more than 50 versts (about 33 miles) in one day. The actual manœuvres are to be preceded by a forward march of three days by the Lublin army, in which experience may be gained of the marching of large bodies of troops in several adjacent columns."

The General idea as to the country covered by the manœuvres was as follows:—(vide sketches.)

A western army (the Lublin army under General Gourko) starts from the line of Rudnja-Gorochoff-Vladimirvolynsk-Kowel in the direction of the triangle Luzk-Dubno-Rovno for the purpose of seizing Rovno and the Railway Junction at Sdolbunovo. The outposts, consisting of two infantry and two cavalry divisions, of an eastern army (the Volhynian army under General Dragomiroff), meet the attacking force on tho Styr-Ikwa line at Luzk and Dubno, and so render possible the concentration, in the neighbourhood of Rovno, of the Volhynian army, where this latter expects to fight the decisive battle.

No further special ideas or details for the opposing armies have come to light. They are included in the above general idea, and may be inferred from the course of the operations.

The manœuvres opened with a three days advance of the Lublin army on the 6th, 7th, and 8th September. This move originated from the front, 130 kilometres in extent (80½ miles),—of Rudnja-Gorochoff-Vladimirvolynsk-Kowel, and was in the direction of Dubno and Luzk.

The main body of the army, *i. e.* the 14th and 15th army corps and the cavalry corps, was massed in the centre between Gorochoff and Vladimirvolynsk, with the independent divisions on the wings.

During this advance the main body of the Volhynian army was massed round Rovno. Luzk was held by one infantry division only, Dubno by a mixed detachment, and between the two General Strukoff's cavalry corps was pushed forward on the left (or far) bank of the Styr.

On the 6th and 7th September the cavalry of both sides marched, but we have no details as to this initiatory movement. General Strukoff, however, withdrew his corps again to the right bank of the Styr. A paper by Major-General Bilderling in the *Invalide* mentions also the following episode. "On the first day of the manœuvres the cavalry (with details) of the attackers was ordered to occupy the line of the Styr, and seize the passages of the river, and should they have been destroyed, either to repair them, or to make new passages at the most favourable spots. The scouts who had been sent forward reconnoitred the opposite bank and its passages, and a few troopers swam their horses across the river. The cavalry pioneers then not only quickly constructed, out of any material to hand, a bridge over the Styr, but actually made it during the night. On the following day several regiments, with artillery, crossed this bridge."

On the 8th September the left wing of the Lublin army, the 3rd infantry of the Guard division, 15th army corps, and Prince Nicolai's cavalry corps, arrived before Luzk.

Luzk is protected by four earthworks on the left bank of the Styr; it was, however, only defended by the 11th infantry division of the Volhynian army. The 9th army corps, belonging to the same army, arrived from Rovno to the east of Luzk on the 8th September, but did not take any action on that day owing to orders from superior authority. In consequence of this the attack succeeded owing to its superior strength (three to one) in infantry and artillery, and the Lublin army took possession of the earthworks and town of Luzk. On the same day (8th September) the right wing of the Lublin army arrived with the 32nd infantry division about 5 kilometres (a little over 3 miles) west of Dubno, and with the 14th army corps at Mlynovo on the Ikwa. Here they found the Volhynian army occupying Dubno with the mixed infantry division, with their 12th army corps in the neighbourhood of Krylovo and Shernovo.

The hamlet of Dubno lies in the marshy valley of the Ikwa on the left bank of the river, over which, south of the village, a railway and a foot-bridge pass. About 1 kilometre (1100 yards) south of these two bridges is a strong permanent fort guarding the passage of the river.

9th September.—Fighting for the passages of the Ikwa occupied this day. The mixed infantry division of the eastern (Volhynian) army, which had to defend these passages, found itself, however, outflanked by the 14th army corps, which pressed on up the river from Mlynovo, and evacuated the fort and town of Dubno before the retiring 12th army corps came up.

Same day.—General Gourko with his left wing succeeded in forcing his adversary, without any delaying action, towards the line of the Stubiel, so that in the later part of the day the Lublin army could be pushed forward to the line of Mlodova and Dolgoscheja. General Dragomiroff concentrated his army opposite it, but behind the Stubiel, the marshy valley of which, full of small lakes, offers a strong position.

10th September.—The Volhynian army with its main forces on the line of Novy-Staw—Satyjew—Shernovo—Warkovitschi, the 9th army corps being near Satyjew, and the 12th from Shernovo towards the south, awaited the renewed attack of General Gourko's army. That general set his masses in motion against Satyjew, and through Dolgoscheja towards Novy-Staw, and won the passages of the Stubiel, but the details of this action are absolutely wanting. It would appear that the strong pressure on their right had caused a precipitate retreat of the Volhynian army on Rovno. It is known, however, that General Strukoff with his cavalry corps achieved a brilliant success on his own right wing, for he succeeded first of all in driving back the enemy's cavalry, and afterwards in checking the infantry of their left wing for a considerable period of time.

11th September.—A day of rest for all the troops. At Rovno, the head-quarters of the Volhynian army, the birthday of his Imperial Majesty the Czar was joyfully celebrated.

12th September.—The decisive day of the whole manœuvres, on which the final battle was fought, due west of Rovno. This town is fortified by five earthworks on the left (west) bank of the river Ustje; three of them are near the villages of Ovarov, Omeljany, and Tynny, and are named after them.

This is the only day for which the *Novoe Vremya* has vouchsafed any *ordre de bataille*, and then only that of the Volhynian army, which runs as follows:—

Directions for the Volhynian Army.

Object.—To delay in Volhynia the forces of their adversary, which are forcing their way into Russia through Lemberg—Vladimirvolynsk—Kowel.

Orders for 12th September.

Should the enemy arrive on the line of the Rovno fortifications, to proceed to the attack.

After orders to the Volhynian Army. Rovno, 11th September 5 P. M.

Directions for 12th September.

The enemy occupies the line of the Stubiel, with considerable forces at Satyjew. The army guards the position of Rovno.

Detail.

(1) Line of battle.

(*a*).—Lieutenant-General Schachowsky.

			Orders.
Mixed Infantry Division ...	11 Battalions.	12 Guns.	To defend the position from Fort Ovarov to Fort Omeljany, the latter not included.
11th Infantry Division ...	16 "	48 "	
5th Sapper Battalion ...	1 "	....	
11th Don-Cossack Regiment.	6 Sotnias.		
Total 28 Battalions. 60 Guns. 6 Sotnias...			

(*b*).—Lieutenant-General Ovander.

		Orders.
9th Army Corps	5th Infy. Divn. 16 Battalions. 24 Guns. 33rd „ 16 „ 24 „	To defend the position from Fort Omeljany to Fort Tynny, both included.
6th Sapper Battalion	... 1 „	
Detailed from 3rd Oremberg Cossack Regiment, 2 Sotnias.		
	Total 33 Battalions. 48 Guns. 2 Sotnias...	

(2) General Reserve.

Lieutenant-General Swjärjeff.

		Orders.
12th Army Corps	12th Infy. Divn. 16 Battalions 48 Guns. 19th „ 16 „ 24 „	At the Village of Tynny.
Detailed from 3rd Oremberg Cossack Regiment, 4 Sotnias.		
	Total 32 Battalions. 72 Guns. 4 Sotnias.	

(3) Cavalry Corps.

Lieutenant-General Strukoff.

			Orders.
11th Cavalry Divn.	18 Squadrons.	12 Guns.	To rendezvous at 7 A. M. at the village of Semigrany. To reconnoitre and report upon the strength of the enemy should he be advancing from Satyjew, and to defend the left flank of the army.
12th „	18 „	12 „	
2 Mixed Cossack Divns.	16 Sotnias.	8 „	
Total	52 Squadrons.	32 Guns...	

(4) Corps of observation on the flanks.

(*a*) Colonel Kajuntschin.

		Orders.
16th Don-Cossack Regiment, 6 Sotnias		To observe and secure the right flank from the village of Karajewitschi.
1st Battery Oremberg	4 Guns.	
Total 6 Sotnias	4 Guns...	

(*b*) Detailed from 17th Don-Cossack Regiment. 2 Sotnias	To observe the left flank from the village of Pjatigorzy.

(5) The Dubno, Rovno, Shitomir, and Tjutkowitschi-Gorodischtsche roads are assigned to the 12th army corps; those north of them to the 11th (mixed) army corps; those south of them to the 9th army corps.

(6) The Telegraph Parks will establish communication between Fort Omeljany and the forts near Ovarov and Tynny.

(7) Reports and Orderlies from 7 A. M. onwards to be directed to Fort Omeljany.

DRAGOMIROFF, LIEUT.-GENERAL,
Commanding Volhynian Army.

According to the *Novoe Vremya* correspondent, Herr Moltschanoff, impartial experts defined the above disposition as a "classical spectacle."

Against this very close disposition of their opponents under the guns of the forts, the Lublin army advanced by the Shernovo (14th army corps) and Satyjew (15th army corps) roads. The shock consequently met the two divisions of the 9th army corps near Forts Omeljany and Tynny, but the attack did not follow at once, for as the 15th army corps neared Forts 1 and 3 (Ovarov and Omeljany), the 14th army corps was still at a distance of some five versts (3 miles) from Fort 4 (Tynny). General Dragomiroff took advantage of this, and towards midday brought up the 12th army corps and 11th infantry division (*i. e.* 48 battalions and 120 guns), and with this imposing mass made a counter attack on the left flank of the 15th army corps. This was a complete success, and with it ended the manœuvres.

The correspondent of the *Novoe Vremya* maintains that the 3rd Guard infantry division, and 33rd infantry divisions of the Lublin army never appeared on the battle-field at all. General Pusyrewski, Chief-of-the-Staff of that army, reports that the troops of his army having completely involved themselves in an attack on the whole of the broad front, the general reserve, consisting presumably of the above named divisions, had been held back at a distance of 3,300 to 3,850 yards from the fighting line.

As to the advance of the Lublin army to the attack, which was much praised for its solidity and masterly ordering, the above quoted correspondent remarks:—"The artillery marched on the road, and the other arms on the sides across the fields. The cavalry alone of this army had somewhat overtaxed the strength of their horses.

13th September.—A day of rest.

14th September.—A parade of all the troops which had taken part in the manœuvres was held on the battle-field of the 12th September between the villages of Omeljany and Tynny before His Imperial Majesty. Five complete army corps, two independent infantry, and two Cossack divisions, were formed up in a huge square, on one side of which the Czar's tent was pitched. The march past of both armies was performed simultaneously, but in opposite directions, so that the Lublin troops marched past the Emperor to the west, and the Volhynians to the east. The entrainment of the troops returning to their garrisons began on the 14th, and lasted till the 20th September. It remains to be noted, that although the manœuvres were throughout interfered with by wet weather, the troops were nevertheless invariably brought under canvas. The line from Kiwerzy to Luzk, laid down shortly before the commencement of hostilities by the Railway Battalions, was not used by the troops, and had no influence on the course of the manœuvres.

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His Excellency SIR F. S. ROBERTS, V. C., Commander-in-Chief in India, in the chair.

THE RE-ORGANIZATION OF OUR NATIVE INFANTRY,

BY LIEUT.-COLONEL G. F. YOUNG,
Assistant Quarter Master General, Army Head Quarters.

"Prepare." "Prepare." "Prepare."

THE CHAIRMAN:—It is a great pleasure to me to preside at the meeting assembled to hear a lecture on such an important subject as that of the reorganization of our native infantry. It is one upon which the efficiency of the army in India so largely depends, that its discussion cannot fail to prove instructive, not only to those who belong to the particular branch of the service with which it deals, but to everyone interested in India. That the writer of the essay which gained the Special Silver Medal of this Institution in 1888 should treat this subject in an able and exhaustive manner, is only to be expected. Having read the lecture, I feel sure that such expectation will be realised, and I think you will find that the question has been taken up by Lieutenant-Colonel Young in a spirit worthy of the very difficult task he has set himself. Amongst an audience so conversant with the history and traditions of the native army, and so intimately acquainted with its requirements, yet whose knowledge has been acquired from very different points of view, owing to the variety in race and religion of the men of whom it is composed, it is impossible that there should not be differences of opinion regarding some of the details of the scheme which is about to be placed before it. Some of you have doubtless got deeply rooted opinions, and perhaps pet schemes, for the solution of the great problem of how best to increase the efficiency of our native infantry: but even if you have, I am confident you will one and all find much food for reflection, and gain some new ideas from this lecture. I remember being struck, as long ago as 1885, by a paper of Colonel Young's on this subject, published in the Journal of this Institution, in which the outline of the scheme now put forward was hinted at. Although the drastic measures now advocated were not proposed, it seemed to me that the suggestions made were worthy of consideration. The question is such a large one, and involves so many issues of a financial and political, as well as of a purely military nature, that without much serious thought, and a very careful weighing of the varied considerations which have to be taken into account, I am not prepared to express a definite opinion on many of the points raised. This, however, I may say, that I believe that any reorganization of the native infantry which may eventually be decided on, will be, to a great extent, on the lines of Colonel Young's lecture. These provide, in particular, for two great wants which have been, and still are, much felt, *viz.*, a sufficiency of British officers in the fighting line, and a more extended field of employment for native officers. On the first point it is unnecessary for me to enlarge, as we are probably all agreed that financial reasons alone have limited the number of British officers with our native regiments. With regard to the second point, I believe there are few of us who have thought seriously over the best means of increasing the utility of the Indian army, to whom the present position of the native officer has not appeared to require improvement. It is a subject which has been brought to notice on more than one occasion during the last five or six years, and has attracted the attention not only of the outside public, but also of Army Head-Quarters, and of the Government of India. No problem connected with the native army presents, perhaps, so many difficulties, and, in endeavouring to solve it, it is necessary to proceed with much deliberation. No one can be more anxious than I am to increase the responsibilities of a class which fills so important a position in the native army; a class, too, which has afforded so many examples of devotion to duty and conspicuous bravery. But as things are at present, difficulties crop up at every turn, and the progress is necessarily, and, as I have said, advisedly slow. I feel sure, ladies and gentlemen, you will agree with me, that anyone who contributes ideas for the accomplishment of our wishes in this respect, is deserving of our gratitude: and I shall be surprised if you do not also agree with me that Colonel Young has earned it for himself.

INTRODUCTION.

1.—In organizing an army, more important by far than the organization of divisions and brigades is that of the units composing them; for, if the organization of these latter is defective, they will be a constant source of weakness throughout the campaign, which nothing else can counterbalance.

Among all our mobilisation requirements, none seem to me so urgent as the reorganization of our Native infantry. It supplies more than half our main arm; it is obviously vitally important that it should be as strong as possible; yet we are probably all agreed that its organization is not strong enough for this particular work.

2.—Now in India we have, in seeking for the best organization for war, a much more difficult problem than they have in Europe; for we have to satisfy several very conflicting conditions—

(1) We have to find the best organization for meeting European troops on a modern battle-field; of course all else should give way to this.

(2) But, besides this, any proposals made must also provide for a thoroughly efficient garrison for India; and the organization which is best for the first is not necessarily best for the second.

(3) And on the top of this again we have also to satisfy certain half-political half-sentimental considerations, which are apt to conflict greatly with what is best for (1) and (2).

The combined result is to make the whole problem one of the most complicated imaginable.

3.—Therefore, before attempting to tackle this knotty question (which bristles everywhere with thorns), I would point out one thing. In a question involving such conflicting conditions, the idea that we shall ever get any organization against which *no* weighty objection can be urged is just a snare preventing our ever getting anything at all. In this matter no sooner is any proposal made than one of the time honoured opposing conditions is dragged forward, a fairly good objection lodged, and the proposal promptly felled. And so we always remain just where we were.

But in all questions so situated the utmost to be expected is a *balance of advantages*; this, therefore, is all that I contend for in this scheme.

4.—As it is no use trying to frame an organizationfor anything until one has first got a clear idea of what the thing to be organized has got to do, let us, before considering what sort of organization our Native infantry require, glance for a moment at what infantry as a whole has in these days got to do.

5.—We all know that "on it must fall the brunt of the battle;" and if we did not know this as a tactical writer's axiom, we might know it from the statistics of losses in modern battles—statistics which must be ever in our minds in framing the organization, and the abstract of which every one knows to be 45 per cent. for infantry as against 20 per cent. for artillery and cavalry.* Were this axiom carried out to its logical conclusion in modern armies, we should expect to find the infantry on the "right of the line" in the handsomest uniform, and with the highest rate of pay, in order by such means to get all the best of the material into that arm which, as long as war lasts, must ever be the main one, and take the largest proportion of knocks. But, however this may be, it is at any rate evident, that wherever else we may put up with weak places in our armour, we dare not do so here; and that, in this particular arm at all events, all must perforce be made just as strong as ever money and thought can make it.

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* See also page 186 of "The Soldier's pocket book."

6.—Its task is thus: Infantry, together with field artillery (the two joined in so close a bond that they are more like one arm than two), has to fight out the final issue on which all depends. Line after line of that infantry has got to advance (over a plain covered with dead and wounded men), not for 300 or 400 yards as in Wellington's day, but for a mile or even more, and under a fire such as the men of those days had no idea of. The first and second lines will not carry the position; nor probably the third or even fourth; the fifth or sixth lines *may;* the seventh and eighth† *must*, or we are beaten, horse, foot, and artillery,

This means an organization in accord, not with what had to be done in Wellington's day, but with what has to be done *now*. And the first point to note with regard to our proposed organization is, that this means first rate "leading," and that *nothing short of the very best leading in the world will do it.*

7.—In this country one-half of each of the brigades who have to perform this task will be Native infantry. What then do these stand in need of? And be it remembered that the reply to this does not affect only our Native infantry; brave men cannot effect impossibilities; and a brigade of which half gives way is in a few minutes afterwards a beaten brigade.

The matter therefore affects our British infantry also.

Improved organization generally means expenditure of money, so it seldom takes place except in consequence of the organization having to meet more severe conditions than before. This is what has happened to our native infantry: organized hitherto for meeting Asiatic enemies, it naturally finds that organization fail when the question becomes one of meeting European troops. The time having come when it has to be put to a new use, a new organization is the inevitable consequence. Very much indeed has been done in all other matters of preparation during the past five years, but this is the most important of all, and appears to me by far the most urgent of our present requirements.

8.—The organization to be sought for is one embodying the following conditions:

(1) The greatest possible fighting power on the battle-field;
(2) A smooth, methodical, and efficient mobilisation;
(3) Satisfactory arrangements for garrisoning India;
(4) If possible, some way of improving the position of the Native officer.

I propose, therefore, dividing the subject into—

Part I.—The requirements of the organization as regards the battle-field.

Part II.—The requirements which the organization should fulfil as regards mobilisation.

Part III.—The requirements which the organization should fulfil as regards an efficient garrison during war.

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† If we have got them!

Part IV.—Improvements in the position of the Native officer.
Part V.—The complete proposal, combining all the above.

A paper on such a subject confined to an hour or so cannot attempt to deal with every possible objection.

Part I.—The requirements as regards the battle-field.

9.—In all questions affecting fighting efficiency, whether it be equipment, or dress, or drill, or organization, the only way to reach a sound result is to go first to the battle-field, see what is wanted there, and then work back from that to all the rest.

10.—What then will be the best organization from the point of view solely of the modern battle-field? Here we are at once met by the question of what is to be the tactical unit, for this affects the organization vitally: is the tactical unit to be the same as in Wellington's day or in the Crimea, or has any change on this point occurred? Now we all know that up to 20 years ago the *battalion* was the tactical unit of infantry; and equally we all know, or ought to know, that it is so no longer; that the *company* has taken its place. The officer commanding a battalion now, *against any European enemy*, is simply in the position formerly occupied by the commander of a brigade, and any officer of infantry who fails, either in his theory or in his practice, to carry this out, simply shows to those around him that he has failed to acquire that knowledge of his profession which, though he cannot have it from personal experience in European war, he can have by reading (as he is bound to do) the current military thought in armies which have that experience.

11.—Now we have a terrible habit (common in all armies long absent from European war) of admitting new principles like this theoretically, and yet declining to carry them into practice. Although the principle that the company is now the sole tactical unit has been an axiom in all armies for no less than 20 years; although it has been accepted (perhaps reluctantly and slowly, but at all events accepted at last) even by ourselves theoretically, is recognised by our drill book, and constantly quoted in conversation, yet I think I can safely appeal to most officers of infantry to corroborate me, that it is not yet carried into actual practice; and that neither at drill nor in interior economy is the officer commanding a battalion yet accustomed to take up, and to maintain, the position associated in our minds with that of a brigadier.

However this may be, there is no doubt whatever, that the tactical unit of infantry in modern war is the company, in no wit less a degree than the battery in artillery or the squadron in cavalry; *and therefore, that any organization which does not proceed fully on this principle will be " ipso facto " condemned as unfit for modern war.*

12.—This being so, the question is, what should be the size of this tactical unit; that is to say, will it be best to have in our battalion four companies of about 250 men, or six companies of about 150 men, or eight companies of about 100 men; or shall we go in for that which I can only call a monstrosity—the double-company system.

Now other armies have mostly, we know, gone in for the first of these, *viz.*, four large companies. But we know also that they fully admit the tactical defect, and that they have only done so under pressure of considerations (the result of conscription), which do not press upon us. On the other hand, our aim undoubtedly is, while unable to adopt conscription with the enormous forces it brings, to make up for our smaller numbers by an exceptionally high efficiency, and this the small sized company distinctly helps to do.

In the introduction of von Goltz's "Nation in Arms", there is a passage (affecting this point) which is most remarkable, seeing that the whole argument of the book is occupied with an elaborate laudation of war as waged by those very "armed millions" thus commented upon. Yet he nevertheless says: "If we look forward into the future, we seem to feel a time coming when the armed millions of the present will have played out their part. A new Alexander will arise, and with a small host of well trained and skilled warriors drive impotent masses before him, when these latter, in their endeavours to increase in numbers, overstep the right bounds, and lose their internal efficiency." This forecast by perhaps the greatest living military writer supplies (unintentionally) a very strong argument against large companies.

Moreover, the whole tendency of infantry tactics points distinctly in the same direction, and to its being recognized that the system of small companies is a distinctly stronger organization tactically than that of large ones.* I say then, without any doubt at all, that on the battle-field our organization requires eight compaies, of not more than 70 to 80 men each.

13.—We can now take the first step back from the battle-field, and see what strength the company should be *on the theatre of war*. For, in order that it may have 70 to 80 men on the battle-field, it must, of course, have a good many more on the theatre of war. How many more?

Wherever reliable figures can be got, it will be found that the total strength in the field of any battalion paraded for action stands on an average about thus—

(*a*) Sick and wounded	$\frac{1}{10}$	Total not actually with their companies ... $\frac{3}{10}$
(*b*) Absent on detachment and short of strength	$\frac{1}{10}$	
(*c*) Present, but on baggage duties, or camp duties, or signallers, or otherwise not actually with their companies	$\frac{1}{10}$	
(*d*) Present on parade with their companies		$\frac{7}{10}$

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* I could give plenty of "chapter and verse" for this. It would indeed be deplorable if England changed to large companies just when all other nations have begun to see the mistake of them. But more deplorable than even this would it be, to have *two different tactical systems in the same brigade!* *i. e.*, the British infantry organized on the system of small companies, yet the Native infantry organized on that of large companies! *This* would indeed be disastrous; it would mean simply destruction.

14.—Supposing, therefore, that we make the theatre of war strength of our proposed company 110 privates, we shall have on the battle-field—

$\frac{7}{10}$ of 110, or 77 men,

which is just about the number we fixed on as the best size for the tactical unit.

Of course (remembering the 45 per cent. loss statistics) a severe action may reduce this to 50 men, but from a merely tactical point of view this will be no harm; while with good arrangements for filling up the waste of war, the fighting strength should on the above basis be generally kept pretty level at from 70 to 80 men. We may say then that the theatre of war strength must be 110 privates.*

15.—So far as to privates. Now as to non-commissioned officers. Active service entails a great strain on the non-commissioned ranks, and after a time there is always a dearth of non-commissioned officers. Let us see what the battle-field requires. The company has four sections; each section as it advances to the attack *must* in these days have not only a commander, *but a second-in-command and a third-in-command;* and these not placed in the ranks and merely told off for this purpose, but ready at hand close to the section commander so as to instantly take his place if he falls, and prevent any break in discipline. No system involving, when the commander of a section or of a company falls, a redistribution of all the subordinate commands will stand for a moment in a modern battle; even omitting any other objection, discipline receives too severe a blow.

Thus each of the four sections, must have on parading for action, one Havildar, one Naick, and one Lance-Naick; this is imperative, even if men should have to be promoted on the spot for it; any shuffling about of non-commissioned officers on casualties occurring is a mere farce of the peace parade.

16.—Similarly the company must have, besides the company commander, a second-in-command, and a third-in-command; and these in the same way placed close to him, and not encumbered with any half-company command,† as they must be ready at any instant to take command of the company, so that there may be no moment when it is not under full control of the senior man uninjured.

Moreover, this is also necessary for another reason; all can no longer be done by one man, the company commander. The latter should control the direction, the mode of advance, and the general management of the fire; these points will fully occupy his attention. The second-in-command's business is to keep a rough "tally" of the distances from the last point where the range was got from the artillery, or to work a range-finder; in any case to be the source of information at all times as to the *range:* also to keep an eye on the consumption of the ammunition, the general whereabouts of the reserve ammunition, and watch for any chances of replenishing ammunition. The third-in-command's special business will be to watch for signals from the battalion commander, control the company signalling party, keep a sharp look out for any threatened attack by cavalry, and be in fact the channel for all *intelligence* to or from the company. As there will be only two officers with each company, the third-in-command will be the senior Havildar, and in view of this and of his often having to be in sole command, I suggest his title being one distinguishing him from all other Havildars, and that he be called the Company Havildar-Major: the present duties of Pay-Havildar and Colour-Havildar being merged in this.

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* But with Lance-naicks, 116, (paragraph 17).

† It is to be hoped that the "half-company" will soon be entirely obsolete.

17.—From the foregoing it is evident that the non-commissioned officers on the battle-field must be five havildars, four naicks, and four lance-naicks. But, besides this, naicks and lance-naicks are always in much request for all sorts of small guards and escorts, and with ammunition parties, signalling parties, &c.; so we must certainly increase each of these ranks by one more, making the total five havildars, five naicks, and five lance-naicks. And to this again we must add certainly one in each rank to allow for sick and wounded, or killed, absent on camp duties, detachments, &c., bringing up the required strength to six of each rank. None of these must now-a-days be in the ranks, so the six lance-naicks must be added to the 110 privates, which makes the total war strength of the company six Havildars, six Naicks, 116 Sepoys, and two Drummers, or 130 all ranks.

18.—As to Drummers. These are a most important item in the fighting power, for when the spirits flag they must help to rouse them, and in the final charge especially the beating of the drums should be a powerful incentive. There must be two to each company (as one may fall!), and *never on any account should they be allowed to play instruments in the Band;* it takes a man his whole time to play a drum properly.

I may add, that if you want to get the most out of a Native regiment in the charge, your drummers should use the native drum. Of course it is queer to our ideas but the point is to get the most fighting power, and undoubtedly this will be done by keeping the English drums for ordinary parades, but in the actual fight using the native drum.

Beside the two drummers per company, there must be a Drum-Major over the whole of them; one of the Naicks will do for this.

19.—There is no need to say anything specially about the band, as with us there is no band on the battle-field; but it may be remarked that the Germans make their band play during the advance to the attack, though how they do it I don't know.

20.—We have now got some idea of how many non-commissioned officers there ought to be by seeing what they have to do. Let us therefore, before coming to the last point in our battle-field requirements—the officers—watch the company for a few minutes in the fight. We are standing some 3,000 yards from the enemy's position, that enemy being an European regiment of another great power; the battalion commander is giving his last instructions to the company commander, namely, as to what is the general object to be striven for by all the companies (each according to the circumstances in which it may find itself), and what the objective point for maintaining a proper direction; but at this distance the position can scarcely be seen, so it is ten to one that it will turn out quite different when they get near it from what it now appears, and that quite different modes of carrying out the battalion commander's object will have to be adopted from those which now seem best. The company is about to be launched on its course, and though they know it not, battalion commander and company commander will not see each other again for many hours.

All being ready, the company forms its line * and advances; slowly and steadily at first, afterwards faster and faster, *but always steadily* on it goes over the bullet-swept plain which stretches between it and the enemy's position; every man and officer have been trained over and over again in this special manœuvre, which has, moreover, formed practically "the march past" of the company before many a general officer; the most iron discipline prevails, every man having well learnt by experience, that so far from the bonds of discipline being looser then than at other times, it is just the reverse; that they are drawn to their very tightest during this manœuvre, while correspondingly relaxed at all other times.

Men begin to fall, but the company does not stop or alter its formation in any way from first to last, but keeps steadily closing on its centre to fill vacancies, and, though it may shrink in size, remains always the same body, under the same control, and quite unaffected by what other bodies come up on its right or left into the general line. A section commander or two fall, but a second-in-command so instantly takes command of the section, that there is not a moment wherein discipline can become relaxed, and half the men scarcely know the command of the section has changed hands. At one point the company unfortunately pauses for a moment on a line of road which has been noted by the enemy's guns and carefully ranged, and a shower of shrapnel given just at the right moment sweeps down nearly one-fourth, and for a moment paralyses the rest: but the drums sound loudly, the company pulls itself together again, and on they go with a fresh spurt, the more so that a company of a rival battalion has come up on one side and threatens to pass them.

On a nearer view the position is evidently quite different from what it appeared at the start, and the company commander calls to his signal party to say this, and ask for fresh instructions (for the age of the mounted Adjutant and Aide-de-Camp has passed away, and the only orders come through the signalling flag); but one of his signallers is down and the other has lost his flag, while the battalion bommander is nowhere to be seen; so they simply make straight for the nearest point in the position.

The company commander himself falls, but the company has scarcely time to know it, before the Lieutenant is roaring out the command to push on, and indiscipline has no moment in which to creep in.

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* I hope a plain single line of men at one man per pace; see essay "Infantry Tactics of the future" (1888); Colonel von Hallen's "Summer Night's Dream" (1890); and results of Swiss artillery experiments (1890).

Other companies reinforce the line to the right and left in gaps created by the now rapid shrinking of all, but it makes no difference that these belong, one to a British regiment, the other to another Native regiment, except in so far as it spurs on our now reduced company not to be passed by any other, black or white. At length reaching the charging point, it pauses for one moment to pour in a deafening hail of magazine fire, and then, *as one small unit in a great, mad, surging wave of the whole line of companies belonging to every battalion in the division*, it charges the position; one drummer is down, but the other makes noise enough for two; the Lieutenant is lost, swallowed up in the crowd, but the company, long and carefully drilled in similar scenes in peace to before all things close up and keep together, no matter what happens, hangs together through it all as a firmly knit lump of men—and they burst into the position. The Company Havildar-Major takes command, yells out to form a line, re-load magazines, and look out for a counter-attack; and the company takes part with others similarly situated in beating this off, the orders being given by an unknown general of another brigade who has lost his own. This done, and night coming on, the company bivouacs where it is, the Havildar-Major managing to replenish its ammunition from some ammunition mules which are wandering about in charge of nobody but a transport driver, who has long since forgotten (if he ever knew) the territorial designation of the British regiment he is attached to. Next morning the company is found by the Lieutenant, who after many enquiries hears where several other companies of the battalion are collected, and takes it there; and it thus comes again under the battalion commander, who till now has never seen more than two of his companies since he launched the whole into the fight nearly 24 hours ago.

21.—Now the above is what we know absolutely our company will have to go through, if in one of the regular infantry brigades on whom "falls the brunt" of a modern battle.

And who is to command this tactical unit, and take it through all that such a day means, besides making a successful result possible by long and careful training for it beforehand? *I said that nothing short of the very best leading in the world will do it*, that is, will carry our Native infantry company through this, and bring it out right side uppermost at the other end. Nothing short of the best will do here, and for this we must have the officer, whom none in the world can touch as a leader of men,—the one who, whether he equals them or not in the book part of it, beats Russian, and French, and German, and every one else at this—*the British officer.* I submit that nothing else will make a Native infantry company bear itself as it must do, or be destroyed; that any other opinion can but be due to a failure to realize the conditions involved; and that this is an essential item in any reorganization of our Native infantry for such a purpose as meeting the style of troops one means when one speaks of European troops in modern war.

The Native cavalry branch, whatever else it may lack, has at all events for years had the inestimable advantage of having its tactical unit commanded by a British officer; the admirable result we all know well, and what the Native infantry so urgently needs, and has long needed, is to be given the same advantage, and to have its tactical unit so commanded also.

22.—It has little or nothing to do with the capability of the Native officer; let him be as capable as possible, it will not alter the matter one jot. Its cause lies not in any failure on the part of the Native officer who is to command, but in the character of the sepoy who is to be commanded, and who will under a British officer perform feats of endurance and bravery against heavy odds,* which nothing would induce him even to attempt under a man of his own race. All Indian history proves this; its roots lie deep in the national characteristics of the two races; and no excellence on the part of the Native officer will ever alter it. I may also call to mind that all through the period when the Native army performed its greatest deeds, all through Lord Lake's campaigns and Sir Arthur Wellesley's campaigns, the company of Native infantry was commanded by a British officer.

23.—But if the British officer is going to command the company on the battle-field, it is absolutely important that he should command it at all other times. Setting aside the fact that in the style of training now necessary for infantry who are to form part of the regular brigades, no officer is fit to undertake the instruction of a company who has not read (and digested) much of what officers of Continental armies have to say about it, which could scarcely be attained even by the best educated Native officer; there is in addition this, that it is only a company commander who can obtain that personal knowledge of the soldier necessary to the leader of an infantry tactical unit.

In artillery we deal chiefly with *guns*, in cavalry with *horses*, but in infantry with *men*. To lead a soldier you must understand him; to understand him you must be associated in all the details of his military life in the way that none but the company commander is. The casual taking command by a British officer of a company in action (without knowing even the *names* of the men, much less their *characters*) is a very different thing from the exercise of such command by an officer who has had to pay them, clothe them, instruct them, and see to all their wants from the time they joined.

Moreover, a British officer thus knowing Native soldiers and thus known by them, will in a very short time gain a power over them such as no Native officer ever attains.

24.—And there must be no Native officer between such British company commander and his men. I yield to no one in full appreciation of the Native officer; but his place is not here. This is vital, as thus only can these companies be fitted for their task; the Native officer acts as a "buffer" between the British officer and the men, such as will absolutely bar all approach to the style of result aimed at, and which must be achieved (not by all battalions, but) by such battalions as are to be placed in an infantry brigade against European troops. The difference in fighting power which this will make is enormous. No one has any idea what a company of Native infantry can be made like, if thus placed entirely in the hands of a British company commander. I venture to assert that the result will astonish everybody.

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* Witness Lieutenant Grant at Thobal.

25.—But it may be said, will not the double-company system meet the case? My answer is, not unless every tactical writer on the continent of Europe is wrong. For the double-company is neither "fish, flesh, nor fowl." *It must always be borne in mind that the double-company in infantry bears no analogy whatever to the squadron in cavalry;* the squadron is the tactical unit in battle; the double-company is not, and never will be made so. The principles of cavalry tactics and infantry tactics are so entirely dissimilar that no similar organization could possibly suit both. It is now an axiom that the tactical unit of infantry is the company; therefore, the double-company is nothing; that is, it is not an unit either of the battle-field or in quarters, and so simply a paper organization, and such it will always remain. It is essential to the conditions of modern war that the tactical unit of infantry shall be (1) large enough to be an entirely self-sufficing unit, and (2) small enough to ensure that it will never under any circumstances have to be broken into two during the attack; it would therefore be opposed to the entire spirit of modern war to link upon the battle-field two such fighting units together. One might even better talk of a double-battery than of a double-company. Lastly, 250 men is by far too large a number for one officer to instruct (as men should be instructed now), where all such instruction must be given in a foreign language.

In every way, therefore, the double-company fails to meet the requirements under consideration.

26.—Again, it may be said, will not the simple attaching in war time of a certain number of additional British officers meet the case? But no such measure as this will suit where a modern battle-field is the thing to be prepared for. It is not a mere question of numbers of officers; but these must, for the sort of fighting under consideration, be part and parcel of the organization, not addenda to it. Not only are they no less required in peace for the war training of the companies,* but also, if merely added to a battalion proceeding on service, they become more or less a fifth wheel to the coach, and, being outside the regular organization, tend to a loss of that cohesion which is so necessary.

Nor must we leave out the feelings of the Native officer in such a case, since its practical effect is to give him command of a company during peace, but to supersede him in it on service.

27.—Thus on every ground, either as to the leading in battle, or the preparation for it in peace, this measure is alike necessary. It is unanswerable, that the leader of the tactical unit in battle, its instructor on the training ground, and its commander in quarters must all be one and the same man; soldiers of every age, from William the Conqueror downwards, would scout the idea of any other method holding water in the day of battle. So that if the British officer is to lead the company on the battle-field, he, *and he alone*, must be its commander in quarters; and, *vice versâ*, if the Native officer is to command it in quarters, he, *and he alone*, ought to be its leader on the battle-field.

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* I have heard it suggested that so many officers would in peace have nothing to do! This is one of the very strangest objections imaginable; I can only say that not only has this not been found in our British regiments (where there is none of the labour entailed by difference of language), but also that *no one who knows the details of how infantry ought to be trained for modern war will think this.* As a fact the number of officers which has been allowed will scarcely admit of all being done that ought to be done without overworking them.

28.—I therefore submit that on various accounts it has now become imperative that the two classes of officers should be to some extent separated (though not entirely); and this, both from the point of view of the efficiency of those battalions which we want to place in our infantry brigades in European warfare, as well as from the point of view of the improved education of the Native officer, which makes him no longer suited to the purely subordinate position which has been his hitherto.

I maintain that we have at present at the same time too few British officers and too many; too few for entirely British leading, too many for giving any scope to the Native officer, while the improved education of the latter makes him less and less suited to the purely subordinate position. It is in fact a compromise between the old "Regular" and "Irregular" systems which has grown up by accident, not design, with the result, that neither the British officer nor the Native officer get that full scope for their respective abilities which each would have if placed in more or less separate spheres of action, and which each had under one or other of the old systems. The two at present are counteracting each other; and the more we go on increasing the number of British officers, while at the same time educating up the Native officer, the more we are increasing this counteraction. I maintain that, if in any battalion we are going to have Native officers commanding the companies *at all*, then the moment a single British officer is added below the position of a field officer, harm results; and, similarly, if in any battalion we are going to have British officers taking command of companies *at all*, then the moment Native officers are put in command of those companies at other times harm results.

At present we have on service a number of British officers who have no place or business except to take command of—the Native officer's command. Hence in every direction, and inevitably, the virtual supersession of the Native officer just at the time when it is most galling to him. And the more capable and well educated he is, the more bitterly he will feel it.

29.—It therefore seems imperative from every point of view, that we should have some battalions in which all the company officers are British and the only Native officers are such as stand outside the company organization; and other battalions in which all the company officers are native, and the only British officers are such as stand outside the company organization. I will come to these latter battalions presently (Part II), but am at present dealing only with the former.

30.—Accepting then that each company in these particular battalions is to have two British officers, the other British officers required are a Commanding Officer, a Second-in-Command, an Adjutant, and a Quartermaster; all these must be supernumerary to the company officers, for two officers per company will (remembering the 45 per cent. loss statistics) allow none for these appointments. As regards Native officers the only ones I propose in these particular battalions are—

1	Subadar-Major	
1	Native Adjutant... ...	Jemadars.
1	Native Quartermaster ...	

The Subadar-Major would be the Native commandant in the lines, and, as the special right hand of the Commanding Officer in all matters of interior economy, would be in a position of the greatest trust and responsibility, with double the pay of a Subadar-Major of the present. The Native Adjutant and Native Quartermaster are both very necessary to work under the British Adjutant and Quartermaster as, well as to be able to carry on the work if the latter are wounded. They would also assist the Subadar-Major generally in the lines during the absence of the British officers.

31. From the whole of the foregoing it appears that, in order to fit it to meet an European enemy, the war strength of the battalion under consideration ought to be as follows:—

1	Lieutenant-Colonel	20 British officers.
1	Major	
8	Captains	
10	Lieutenants	
1	Subadar-Major	3 Native officers.
2	Jemadars	
8	Company Havildar-Majors ...	1,040 non-commissioned officers and men.
40	Havildars	
48	Naicks	
16	Drummers	
928	Sepoys	
	(8 companies of 116 each) ...	

As regards the Company Havidar-Majors, it is obvious that this non-commissioned officer will have quite as much power and responsibility as any Jemadar now, while with Rs. 32 a month he is also practically as well off in pay. But I prefer, not to call him a Jemadar, and to keep him a non-commissioned officer, simply in order to mark the fact that the sepoy's officer is an Englishman, and without any Native officer between them.

In the above total are intended to be included a Band Havildar, a Naick as Drum-Major, and two Bandsmen per company.

One Naick in each company to receive a staff pay of Rs. 2 for assisting the Company Havildar-Major in matters of pay, &c.

32.—Lastly, it is most desirable, as a means of getting the maximum fighting power, that, if possible, such a battalion should be all of one class, as (setting aside all the political and recruiting advantages thereby) the fighting power of a class regiment is vastly greater than of a mixed regiment. Wherever in the past, regiments have been put to any really severe test, it will invariably be found that the regiments which come out best are always either entirely or mainly of one class. Nor is this exemplified merely by certain favourite classes such as Gurkhas or Sikhs, but, on the contrary, seems equally borne out whatever the class, and in both cavalry and infantry.

Part II.—The requirements as regards mobilisation.

33.—From a mobilisation point of view the requirements which the organization should fulfil appear to be—

I.—That the war strength be at least not less than that at present fixed, *viz.*, 720.

II.—That the war strength, whatever it be, shall be made up without including in it any reservists; (1) because they will take many days to come in; (2) because when they do, they are not fit at once to take the field.

III.—That whether the war strength fixed upon be obtained from the peace strength of a single battalion, or from a group of three linked battalions, or from a double-battalion regiment, it must, to fulfil mobilisation requirements thoroughly, be completed in the same cantonment.

This is very important, (1) because otherwise it will hamper the railways much at a time when all their power should be free for other work; (2) because any other arrangement will inevitably make the battalions take far longer to get ready, besides introducing possible elements of confusion in many details; (3) because even when ready the battalion will be wanting in *cohesion.*

IV.—That the transition from a peace state of things to a war state of things should be as simple as possible.

V.—That the arrangements should be such as will conduce to the most efficient *preparation* for war; so that the units placed in the field on mobilisation should be the most perfect ones obtainable.

34.—To meet the above requirements, my proposal is this. To double together our present battalions, not merely as linked battalions, but formed into regular double-battalion regiments; with one Colonel over the whole, one mess for the whole of the British officers, with lines as close as circumstances permit, with one band for the whole regiment, and with the two battalions in every way welded together into one complete regiment; all stations being made, with very few exceptions, two-battalion stations (the majority are so now), and both battalions being moved together in relief as one regiment.

The first battalion to be organized in accordance with Part I, and used for meeting European enemies; the second battalion to be organized as presently described, and used for meeting Asiatic enemies.

As two existing battalions number on mobilisation 896 + 896 + 400 (reservists), or a total of 2,192 men, it is obvious that such a double-battalion regiment could easily out of this place in the field one battalion of a war strength of 1,040, and still leave enough in the other battalion (out of the 1,152 remaining) for it to move out with a movable column at a strength of at least 700, and probably more.

35.—Comparing this proposal with the five mobilisation requirements—

The war strength of the first battalion of this double-battalion regiment is 1,040 non-commissioned officers and men; it therefore not merely fulfils Point I, but *gives an increase to the field army of no less than 300 men per battalion.*

This is done without making use of any reservists; therefore the organization fulfils Point II also.

It is entirely completed in the station where the whole are quartered in peace; therefore it is all right also as regards Point III.

It remains therefore to see (IV) whether the transition from peace to war is simple; and (V) whether the arrangements generally conduce to the most efficient preparation for war possible.

36. First, then, as regards officers. These I propose shall be as shown in Table A. Those proposed for the first battalion are as fixed by Part I as the number necessary for any battalion which has to meet European troops. Those proposed for the second battalion are as follows based on the principles advocated in paragraph 29:—

1	Lieutenant-Colonel	4 British officers.
1	Major	
1	Lieutenant and Adjutant	
1	Lieutenant and Quartermaster ...	
1	Subadar-Major	19 Native officers.
8	Subadars	
10	Jemadars (including Native Adjutant and Native Quartermaster). ...	

There are two very strong reasons for this—(1) that all tactical requirements of the day demand the abolition of anything like a wing command, so that all orders may be direct from battalion commander to company commander; (2) that nothing will tend better to increase the scope for the Native officer than thus removing the wing commander (and his Subaltern) from over the Native officer's head, and giving him the full charge of his company.

As regards the non-commissioned officers these are the same as now, except that in the 1st battalion there is an addition of 8 Havildars and 8 Naicks.

As the whole of both officers and non-commissioned officers are in both battalions exactly the same in peace as in war, there will in these ranks be no changes whatever on mobilisation.

37. Coming now to the men. Any two existing battlions (say the 37th and 38th Dogras at Sialkot) stand at present as shown in the upper part of Table (B).

In that table we have—

(*a*) Two existing battalions as they stand at present.

(*b*) The same formed, as proposed, into a double-battalion regiment. It will be seen that each battalion remains just as now, except for the addition in the first battalion of 8 Havildars and 8 Naicks.

(*c*) The amount of change on mobilisation. It will be seen that this is very small.

38.—Thus the whole amount of change from a peace state of things to a war state of things among both officers, non-commissioned officers, and men amounts only to the following, while even this only takes place between battalions of the same regiment situated in two adjacent sets of lines—

(i) The first battalion receives from the second battalion 128 men to complete it to war strength;

(ii) It also exchanges its sick and weakly men (say about 120) for men fit for service.

Under no other system could the changes on mobilisation be so small and so simple, so that we may fairly say that point IV of the mobilisation requirements is also fully met.

39—Nor after these transfers will the second battalion fail in any way. Its total, including the reservists, is 1,168; a large number of these will, of course, be men unfit for service (either as sick, recruits, &c.), but it is a liberal allowance to put all these at 468 men, and even then it has still a good 700 men thoroughly fit to move out as part of any movable column required. This is quite as much as the battalion of one of our present groups which is left behind for the same purpose could ever do.

40.—Now as to recruits and reservists. At present a battalion in the field leaves all such, together with its sick, &c., at a depôt, which generally consists roughly of the following:—

1 British officer ... ...
2 Native officers ... ...
5 Havildars ... ...
5 Naicks ... ...
About 80 recruits ... ...
„ 120 sick and weakly men ...
„ 200 reservists... ... ...
} Total about 412 all ranks.

This has three disadvantages—

(1) Much correspondence and accounts with the battalion in the field: yet a battalion on service has no time or facilities for corresponding about the affairs of some 300 or 400 men at a depôt.

(2) It necessitates an extra British officer to be left in charge of the depôt, and a separate staff and office establishment, all involving a loss of power.

(3). Men at a depôt cannot be as efficiently trained as if they were an integral part of a battalion.

Instead, therefore, of all this, I propose that there should be no such depôt, and that all who are left behind should belong to the second battalion. And, as it is undesirable to have more transfers at mobilisation time than are really necessary, I propose that all recruits and reservists should *at all times* belong to this second battalion, thus limiting the men to be exchanged on mobilisation simply to the sick and weakly, and also enabling recruiting and reserve matters to be more efficiently dealt with.

At the same time the two battalions would not be allowed to be very unequally balanced as regards strength at all peace parades. Roughly, they would stand somewhat thus in peace as regards privates—

1st Battalion.		*2nd Battalion.*	
Sick, &c.	120	Sick &c.	120
Available effective ...	680	Recruits, say	150
		Available effective ...	530
TOTAL ...	800	TOTAL ...	800

and by giving all the garrison duties to the first battalion, the two could always be made to turn out on peace parades at the same average strength, which would be the same as they do now.

41.—Lastly, as regards the preparation for war. Both battalions would be kept equally fit for all service against Asiatics. But as regards the preparation for the more severe task, each would take a separate sphere of the work. In this the special business of the second battalion would be (1) the training up to a certain point, *viz.*, that to which all battalions now attain, and (2) the management of all recruiting and reserve matters; while the special business of the first battalion would be all details of the more advanced training necessary to fit a Native battalion to oppose European troops successfully, By this division of the work a much higher standard will be reached with ease than can be now by any amount of effort.

42. The difference between the present and the proposed organization is shown in Table C. and is practically a difference only among the officers.

The total number of officers in the regiment is—

		1st Batt.	*2nd Batt.*	*Total.*	
British officers.	Lieutenant-Colonels	1	1	2	24
	Majors	1	1	2	
	Captains	8	...	8	
	Lieutenants	10	2	12	
Native officers	Subadar-Majors and Subadars ...	1	9	10	22
	Jemadars	2	10	12	

There is thus for every pair of battalions an increase of 8 British officers and a reduction of 10 Native officers, but the latter is balanced by the arrangements detailed in Part IV.

43.—The rates of pay proposed are shown in Table D. and are as follows :—

1st Battalion.		*2nd Battalion.*	
Lieutenant-colonel	(As now.)	Lieutenant-Colonel ...	(As now.)
Major, 2nd-in-command,	Rs. 300 staff.	Major, 2nd-in-command ...	
Capts. Comdg. Companies,	Rs. 200 staff.	Lieutenant and Adjutant...	
Lieutenants	Rs. 100 staff.	Lieutenant and Quartermaster.*	
Adjutant	(As now.)		
Quartermaster*	(As now.)	Subadar-major	(As now.)
Subadar-major	Rs. 300	Subadars	
Jemadar adjutant	„ 75	Jemadars	
Jemadar quartermaster	„ 70	Jemadar adjutant	Rs. 75.
Company Havildar-Major	„ 32	Jemadar quartermaster ...	„ 70.

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* But with, in addition, an office allowance in each battalion of Rs. 30 a month.

44.—Thus the proposals as regards these mobilisation requirements are—

(*a*) That our present battalions be doubled together into double-battalion regiments, the two battalions standing when this has been done as in the upper half of Table (A).

(*b*) That on mobilisation the second battalion completes the first battalion to a war strength of 1,040, by the addition of 128 men, when the whole will stand as in the lower half of Table A.*

(*c*) That all recruits should belong to the second battalion. This, of course, is not a necessity, but there are three strong reasons for it—(1) to reduce the transfers on mobilisation; (2) to keep the number receiving the more extended training of the first battalion as large as possible; (3) to keep the two spheres of work distinct, and therefore the preparation for war better done than if both battalions do a little of everything.

(*d*) That all reservists should belong to the second battalion. This in the same way is not a necessity, but simplifies the things to be done on mobilisation, and causes all reserve matters to be better done.

(*e*) That the battalion on service should own no men at any depôt. All men sent back from the field to be transferred to the second battalion and all men sent up to the field to be transferred to the first battalion.†

(*f*) All ranks to regularly pass in turn from the second battalion to the first battalion. Exceptions to this to be allowed in the case of non-commissioned officers promoted on service when necessary.

(*g*) Both the Lieutenant-Colonel and the Major of the second battalion to be the juniors of their rank, passing in their turn to the first battalion.

(*h*) A Colonel to command the whole regiment, and control all transfers between the battalions.

Part III.—The Garrison requirements.

45.—The two points which the organization must meet as regards this are—

(i) Ability of the battalion left behind to move out in proper strength with a movable column; and

(ii) Satisfactory arrangements for supplying reinforcements to the field army.

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* In the case of a frontier expedition there is nothing to prevent the process in (*b*) being reversed, and the first battalion giving the second battalion any men required to complete it for such service to any strength desired. The two battalions would take their turn for all Asiatic warfare, and each would therefore see service just as often as it does now, neither more nor less.

† But see note † to (*b*) above.

As regards (i), we see by Table (A) that the battalion left behind has on mobilisation a total strength of 1,168 ; therefore, even supposing as many as 468 of these are non-effectives, even this still leaves power to move out 700 strong.

46.—As regards (ii), the waste of war will require (remembering the 45 per cent. losses) roughly every month—

1 British officer. | 2 Naicks.
2 Havildars. | 1 Drummer.
50 Sepoys.

The second battalion will certainly find no difficulty in supplying the first battalion at the rate of 50 men a month, commencing as usual with those of longest service. I may here point out that under this organization all men sent to the front will be maturely seasoned soldiers, never youths who have only just passed their drill, as the whole 1,168 have to be exhausted before a man is sent who was enlisted in the first month of the war.

47.—The battalion which is feeding the other must under any organization begin recruiting at once on the commencement of the campaign ; but under this organization there will be one not small advantage, namely, that the mothers and aunts need not be in such terror at their young hopeful being enlisted by this second battalion as they are now when enlisted direct by the battalion which is on service ; for there will be 1,168 men all to go before him, and this at 50 per month means nearly two years, by which time the war may very probably be over.

48.—The officer must, of course, come from England or elsewhere as now, as the second battalion can supply all but this item. It is no part of this paper to consider the question of a reserve of officers, so that one need only note here that one Lieutenant will be required per month for each battalion in the field army. A battalion which starts with 20 British officers, and is reinforced at the rate of one per month, ought ordinarily not to run short of officers, though any one who has read the list of officers of infantry killed and wounded at Chillianwala and others of our Punjab battles will know that on occasion this reinforcement may have to be multiplied *by ten !*[*]

Part IV.—Improvements in the position of the Native officer.

49.—Turning now to the position of the Native officer under this scheme. As a "set-off" against the reduction of 10 Native officers out of every 32[†] we have the following very solid advantages :—

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[*] Chillianwala is a good instance to take, because (while we have very complete details about it) it was not a battle fought against breechloaders and even the opposing muzzleloaders were not in European hands.

The losses of Pennycuick's Brigade were ... ...

	Officers.	Men.
24th Foot	23	597
30th N. I.	21	264
56th N. I.	18	304

For total losses see Table H.

[†] It must always be borne in mind that if the 8 Company Havildar-Majors are as well off as Jemadars, this reduction becomes only 2 Native officers out of 32.

First.—The improvement in the position of both the Subadar-Majors, and the very large increase in the pay of one of them, *viz*, from Rs. 150 a month, as now, to Rs. 300 a month as proposed.

Second.—Instead of, as now, two Jemadar Adjutants, each with pay at Rs. 67 a month, we have—

Two Jemadar Adjutants, with pay at Rs. 75 a month; and
Two Jemadar Quartermasters, with pay at Rs. 70 a month.

Third.—The creation of 8 appointments as Company Havildar-Major, with pay at Rs. 32 a month, which will make them (as they have not a Native officer's expenses) practically as well off as a jemadar is now, and with more power.

These three points alone would quite counterbalance the above-mentioned reduction.

50.—But besides this (not to mention that the three appointments in the first battalion will be coveted ones), the position of the whole of the Native officers in the second battalion is very materially improved. Here the tactical requirements of the day, which demand that the commander of a company should have no other authority between him and the battalion commander, enables us, while meeting this, to also meet the required improvement in the position of the Native officer. This is done by removing the wing commander and his Subaltern, so that the Subadar of a company in the second battalion will be for the first time a real company commander with full responsibility for his command, and will find his position much improved thereby.

51,—Besides the above I also urge that in the frontier levies which I believe are likely to be raised from time to time, the appointments of commandant and of second-in-command be given to Native officers. This would give those few Native officers who show themselves really worthy of exceptional advancement wide opportunities of distinguishing themselves, and of being advanced by degrees to any rank thought suitable, while it would show to all Native officers that an avenue was open to them, provided only they showed themselves worthy of it.*

If this can be done, and if the second battalions are given their fair share of service on hill expeditions, &c, the Native officers will certainly, taking the whole of the above measures together, have no reason whatever to feel that either their position or their prospects have been damaged by this reorganization, but much the reverse.

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* Some have said that Native officers will deteriorate, as they will feel that however much they may be given greater responsibilities, and however much they may see service against Asiatics they will not be used against European troops. The reply to this is (1) that we cannot afford to risk an Empire in order to provide Native officers with subjects to swagger about, but (2) that any Native officer who wishes to be one who "goes against European troops" has the matter quite in his own hands; he has only to do one thing, viz., prove himself to have that exceptional ability which is the "*sine quâ non*" for the purpose; he will then most undoubtedly obtain his desire and be sent.

Part V.—The complete proposal.

52.—We are now in a position to look at the scheme as a whole.

We have in the Bengal army 64 battalions, shown in Table E. I propose to leave the eight special corps shown under heading (A) as they are, and to couple up the 56 battalions shown under heading (B) into 28 double-battalion regiments. The distribution might perhaps be—

28 regiments ... { 15 Punjab....... (30 battalions).
6 Gurkha....... (12 battalions).
7 Hindustani... (14 battalions).

53.—The two battalions would move together in relief. The large majority of our stations are already two-battalion stations, and there would I think be no real difficulty in making all so. It is only a civilian who imagines there is any strength in a number of little bodies of troops dotted all about a district; the soldier knows, that by collecting these in a few central points the power of putting down disturbance in any direction is, so long as communications are good, not reduced but increased, though the red coat may not be visible in so many places. The opposite theory would involve a detachment in every town, and weakness everywhere. So that as railways and good roads increase, the groups may with advantage become fewer and larger. For instance, two battalions at Jhelum and two battalions at Sialkot represent a greater power of putting down any armed disturbance in the districts lying between those points, than if one battalion were at Jhelum, one at Gujerat, one at Wazirabad, and one at Sialkot. It is the power of combination, that is all; but it is not so palpable. Another advantage is that it improves very much the power of satisfactory training for war, for which single-battalion stations are simply ruinous.

I think, therefore, that, provided the total number of battalions in the particular district is not reduced, there are very few single-battalion stations (if any) which cannot be either abolished or made two battalion ones. If to impress the people by the sight of military power be the object, then the concentration at any point of a small force for manœuvres for a month or so will do this far better than all the little single battalions dotted about broadcast will ever do.

54.—The two battalions of these double-battalion regiments are to be organized differently, because their purpose is different. In the first battalion all the company officers are British, and the only Native officers are in the position of regimental staff; in the second battalion all the company officers are Native, and the only British officers are in the position of regimental staff. In the first battalion 20 British officers and 3 Native; in the second battalion 4 British officers and 19 Native: total 23 officers in each battalion (Table C).

The purpose for which the first battalion is organized is for forming part of an infantry brigade when the enemy is European. The purpose for which the second battalion is organized is for forming part of an infantry brigade when the enemy is Asiatic (either in India or on its frontier).

55.—As in war, so in peace; therefore at *all* times all ranks (British officers included) pass regularly in turn from the second battalion to the first battalion, and the only difference is that in war the pace of this movement is accelerated. For the same reason it is also convenient to hand over to this latter battalion the management, for the entire regiment, of all matters relating to making good (by means of either recruits enlisted or reservists called in) the "waste," which is of course always going on,—in peace little, in war much.

56.—All ranks at the theatre of war belong to the first battalion, and all ranks not at the theatre of war belong to the second battalion,* thereby greatly simplifying all that has to be done by both parties in war time.

57.—No separate depôts or depôt centres are necessary, the regiment containing all this, and being complete in itself. If the regiment is quartered at an unusual distance from its recruiting ground, special arrangements can always be made to meet this during such time as the regiment remains so quartered, or even as a specical case the second battalion might be moved there bodily.

58.—The non-commissioned officers to be in the second battalion the same as now, 40 Havildars and 40 Naicks; in the first battalion, 48 Havildars and 48 Naicks, The senior Havildar in each company to be called the Company Havildar-Major, with pay at Rs. 32 a month; a Naick as his assistant to receive a staff pay of Rs. 2 a month.

59.—The privates to be in both battalions the same as now. On mobilisation the first battalion to receive an increase of 128 men, bringing up the war strength to 1,040, and the second battalion to receive an increase of 400 men (reservists), bringing up its total strength to 1,108.

No changes among officers or non-commissioned officers on mobilisation.

60.—Thus the only changes necessary to convert our existing organization into that proposed will be—

(*a*) The increase of 8 British officers for every pair of battalions.
(*b*) The reduction of 10 Native officers for every pair of battalions.
(*c*) The promotion of 8 Havildars and 8 Naicks in the first battalion.

61.—As regards the position of individuals under these proposals. To the private soldier there is practically no change; instead of enlisting direct into the first battalion, men will wait their turn to pass into it from the second battalion. Should the regiment not be a class regiment, the companies of each class will, of course, be the same in each battalion.

62.—To the non-commissioned officer, the only change is the acceptable one of an increase in their number, and the creation of the new appointment of Company Havildar-Major. The latter appointment will be a very important one; he will be the head of the company in the lines, reporting direct to the captain of the company. To assist him in that part of his work now done by the Pay Havildar, he has a Naick as his assistant. The only other point as regards the non-commissioned officers, is that in the first battalion there will be no Drill Havildar, all instruction being given in the company under its own officers and non-commissioned officers; in the second battalion, Drill Havildar, Colour Havildars, and Pay Havildars, will remain as now.

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* Or when the enemy is Asiatic, this position can, if desired, be reversed, vide note to para. 44 (*b*).

In all ranks it will be the right of the senior to serve in the first battalion, subject to the power of the Colonel placed over both battalions to make any exceptions where it is for the good of the service.

63.—As regards the Native officers. In the first battalion the Subadar-Major's appointment will be a much coveted prize; it is given a high rate of pay (double the present pay), and will be one of the most responsible appointments any Native officer could have. He would have nothing to do with the training or interior economy of the companies, but be the general adviser of the commanding officer on all matters connected with the general welfare of the Native ranks, being the Native commandant and representative of the commanding officer in the lines. The style of Native officer who would be chosen for this appointment would not be one who was specially brilliant as regards drill (which in this position would not be necessary), but one who from his sound sense, trustworthy character, and influence with all classes could give the commanding officer valuable assistance in all matters concerning the Native ranks, apart from their parade duties. The high pay would both mark the trust reposed in him, and help to ensure its being able to be relied upon. He has under his direct orders the Jemadar Adjutant and the Jemadar Quartermaster.

64.—As regards the rest of the Native officers, I have already detailed in Part IV the considerable advantages which will be gained by them all.

65.—As regards the British officers, there is little to add. The captains of companies with a staff of Rs. 200 a month would be well paid: the other ranks receive the same as now, except that there is an increase of Rs. 30 a month to the 2nd-in-command in the first battalion, and an office allowance to the Quartermasters in both battalions.

About 200 additional British officers altogether would be required; but as there is any amount of the very best material for this in the world spoiling by hundreds in England for want of such a chance, there certainly will be no difficulty here.

66.—It will have been seen that I hope for an advance in all training second only to that in battle-field efficiency. We shall for the first time be able to enter an atmosphere as regards training for war which we can at present only watch other armies engaged in. Even our best Native Infantry battalions are nothing at all to what all should become under this system.

Nor will this advance be confined to the first battalions; the Subadars commanding companies in the second battalion will be spurred on to emulate the methods of the Captains of companies in the first battalion, and (the two battalions being always in such close contact) will learn a hundred hints from the latter as to the way a British officer manages and trains a company. I look upon all this as invaluable, while it is quite unattainable under any other system. An increase of efficiency will take place all round.

67.—As regards the Colonel over the whole regiment, I have not in the scheme provided a special officer for this. There is choice of several methods; (1) the officer commanding the station might be "ex-officio" Colonel of the double-battalion regiment quartered there; or (2) the Lieutenant-Colonel of the 1st battalion might be also Colonel of the entire regiment; or (3) if neither of these suit, then a Colonel of the whole regiment might be given in addition. Probably the course adopted should be either (1) or (3), in view of the fact that the full Colonel would be required to remain behind to superintend the raising of any third battalion under para. 79.

68.—As regards messes, bands, and colours. There would be one mess for the entire regiment of 24 British officers, one band, and one bandmaster. Both mess and band would undoubtedly be very fine. Each battalion would supply half the band, and be considered as having an equal claim on its services. On the march half the band would march with each battalion. Each battalion would have its colours, but with the battles of both battalions thereon.

69.—It now only remains to consider how many of these double-battalion regiments there are to be, of what classes, and the cost (if any) of the scheme.

Tables A, B and C have shown the details already referred to. Table D shows that every pair of existing battalions converted into a double-battalion regiment will cost an increase of Rs. 33,360 per annum.*

70.—The number and classification of the 64 existing battalions belonging to Bengal are shown in Table E. For any field army we require—

(*x*) A certain number of battalions for the infantry brigades; and
(*y*) A certain number of battalions for divisional troops.

The eight battalions under heading (A) of the above table are proposed to be left unaltered. These will do for the divisional battalions, or at any rate for the majority of them.

This leaves 56 battalions under heading (B), which would form 28 *double-battalion regiments*, each regiment able to supply one battalion for the infantry brigades.

This costs (see alternative I in Table F) an increase of a little over 9 lakhs a year—a very small sum in such a matter as that under consideration.

71.—In case, however, it be desired to obtain this reorganization without even this amount of expenditure, I have shown in Table F three other alternatives, costing respectively 6 lakhs, 3 lakhs, and 1 lakh;[*] the last (No. IV) reduces three existing battalions, forms *27 double-battalion regiments, instead of 28*, and keeps 7 corps unaltered (instead of 8); its cost (1 lakh) is practically nothing.

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* Including an office allowance of Rs. 30 to the Quartermaster in each of the two battalions—an allowance not given at present, but most necessary for true efficiency, especially with the increased work which will inevitably ensue to these officers.

72.—The alternative proposed as alternative No I is, of course, the best, and would enable Bengal to give towards any general field army the following numbers of first class troops:—

(x) For infantry brigades.

15 Punjab 1st battalions... ... }
6 Gurkha 1st battalions... ... } 28 battalions.
7 Hindustani 1st battalions ... }

(y) For divisional troops.

1 Guides Infantry.. ... ... }
3 Pioneer battalions ... ... }
3 Assam battalions ... ... } 8 battalions †
1 Baluch (or other) battalion . . }

But even alternative No. IV would give—

(x) For infantry brigades ... ... 27 battalions.
(y) For divisional troops ... ... 7 battalions.‡

73—So that this scheme gives (irrespective of all others) the following six solid advantages:—

I.—The organization which in my humble opinion is indispensable for the modern battle-field.

II.—First class troops in sufficient numbers for mobilisation purposes, and with a good margin of such troops to spare.

III.—A war strength of 1,040 without indenting on any other regiment.

IV.—The arrangements necessary on mobilisation *few, easy,* and *simple.*

V.—Satisfactory arrangements for garrisoning India, and for sending regular reinforcements of trained men (not recruits) to the front.

VI.—A considerable advance in all training for war made possible.

74.—It is impossible to show in any table the immense increase of fighting power which the whole measure represents. This, I think, only an officer of infantry can appreciate at its full value; as before said, in the artillery it is all guns, in the cavalry it is all horses, but in the infantry it is all *men;* and where it is a question of how men should be led, to get the most out of them, and how men should be organized, to help them to do best what they have to do, an officer of infantry will see bearings in the matter lying deep below the surface where any other will merely see those on the surface. Those 28 battalions available for infantry brigades are *the first battalions of 28 double-battalion regiments*, each organized and prepared (in the manner I have attemped to describe) for the great strain which in battle will fall on those infantry brigades. It is easy enough *to feel* the difference which this will make, but it is one almost impossible to describe; but I know that I am not exaggerating when I say that each one of those 28 battalions is, *so long as the enemy is an European one*, worth at least two existing battalions.

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[*] With regard to the saving by the reduction of an existing battalion, it is to be noted that, including all clothing, ordnance, and medical charges, and also hutting charges, but *not* including several important items, such as pension charges, and transport charges, the total cost of an existing battalion is Rs. 2,64,000 per annum. There would also be a further saving on each double-battalion regiment formed, in that (while retaining both the medical officers) only one hospital and one set of medical equipment would be required. Whereas there are strong arguments against *station* hospitals for the Native army, there could be none against a single hospital for the double-battalion regiment. This, however, has not been taken credit for in calculating the cost of the scheme.

† As there is a large margin to spare, any (or even all) of those under (*y*) could be held not available, and yet there are enough.

‡ Any of those under heading (*x*) can equally, of course, be used as divisional troops if necessary; but not *vice versâ.*

To explain why this is so is beyond my powers. I can only appeal to the instincts of officers of infantry with reference to what I have said in Part I of this paper, and point to the picture I have there most imperfectly tried to draw of the strain which this or any other organization must be able to stand, or collapse. *If any strength at all is added by this organization, then most emphatically is that organization necessary, for in this matter anything short of the very greatest strength obtainable is suicidal.*

75.—Supposing that on financial grounds* it be considered necessary to choose alternative IV; and to any objection in that case to the reduction of three existing battalions, I can only say that the object in view is not a certain number of battalions, but a certain amount of fighting power, and it is incontestable even in that case, that the 61 battalions left after any such reduction, represent a fighting power out of all proportion greater than do the 64 battalions before it. Moreover it must not be forgotten that over and above all other items of increased fighting power, the scheme gives the very tangible one of *an increase to the field army of nearly 9000 men from Bengal alone, or taking the whole field army together, of perhaps nearly double this nnmber.*

76.—Nor is it only as regards the actual battle-field that efficiency is increased. That efficiency will always largely depend on two other things—(1) a simple and smooth mobilisation; and (2) a methodical and satisfactory supply of reinforcements of fully trained men. And I maintain that the proposed organization achieves both these to an extent which I do not think any other can.

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* In making the calculation of the cost of the scheme there is one item which I have been forced to omit, viz., the increase, whatever it may be, to the pension charges caused by the addition of 200 British officers to the army; I have found it quite impossible to obtain any data for such a calculation, as it appears not to have been taken into account on other occasions when the numbers have been increased. I may note, however, that there are the following savings which may be set off against any such expense:—

(1) The pension charges reduced by the reduction of 280 native officers.

(2) The savings effected by having only one hospital and one set of medical equipment for the two battalions.

(3) The clothing, hutting, and compensation charges for 280 native officers.

It is quite possible that the whole of these may *more than* balance the cost of the item in question.

77.—Nor will it be found on examination to fall short as regards the obligatory garrisons to be maintained in the absence of the field army, though it does not seem necessary to detail these here.

78.—In the foregoing, I have referred throughout only to the Bengal army. The same principal would, of course, be followed in the Bombay and Madras armies.

79.—Should it be desired at any future time to still further augment our force, this could be very effectively done by raising the second battalion to the same status as the first battalion by the addition of the necessary British officers, and raising a third battalion to each regiment in its place.

80.—It should be observed that this proposed organization, with two halves of one body each with separate duties to perform, is called for simply by the pressure of new conditions, now for the first time, it is true, felt by India, but long since felt and met in similar ways by other nations. I have shown that full compliance with battle-field requirements necessitates a war strength of about 1,000 men. Supposing, therefore, that no such organization be adopted, then one of two alternatives seem inevitable—

(1) Either a large increase to the army, so as to allow each battalion a paper strength of about 1,300 men, as only out of such can a war strength of 1,000 be got; or,

(2) Drafts from other corps to complete it; a measure to which, of course, there are very grave objections, and one which would only be adopted all else failing.

Omitting either of these alternatives, then nothing remains but to reduce the war strength to something like 650 men; but this would cause battalions to stand on the battle-field at only about 450 men, and show an almost desperate case.

81.—I have said nothing about the three-group system, because each battalion of such a group will always remain in reality an entirely separate regiment. The group has about it none of the distinctive characteristics of the united double-battalion regiment; any men transferred from one of its battalions to another go really to a new regiment; while it is also quite impossible to keep the whole three battalions always together, which is a vital point.

82.—Lastly, I would note that it is plain that our peculiar position demands two forces for two very different duties, and therefore that no attempt to have all our battalions organized in the same way can possibly give a satisfactory result. Again, the more one looks into this question, the more evident it becomes that for the highest fighting power, we *must* have for every battalion in the field another behind it in India, not merely to do depôt work, but to do that conjoined with a good deal more. This necessity is specially brought out in the case of Gurkha regiments, as these have practically no reserves.

This scheme, while giving the two forces above-mentioned, binds them together into one homogeneous whole. The chief objection that I am aware of is a purely sentimental one, *viz.*, the idea of having a certain number of battalions not intended for the front in a war against an

European enemy. But in this it is forgotten that we are not here dealing with separate and independent regiments, but with *battalions* which are each part of one homogeneous whole—the regiment. And as it is practically only the name and the colours of the second battalion which thus remain behind (since in such a war every individual will certainly go to the front in his turn), this objection becomes almost entirely a sentimental one. It cannot be that it is worth while for such a reason to sacrifice such great advantages (see also paragraph 3).

At the same time the second battalion must on no account be allowed to drift into becoming a mere depot battalion Whether it does so or not will depend entirely on the higher military authorities, on their treatment of it and their expectations from it. It *can*, and it *should*, be made just as good, *against Asiatics*, as the first battalion; and if all ranks know that this is expected it will most certainly be done; but if not, it will not be done. To show that it *can* be done, I need do no more than instance the capabilities of our old irregular regiments before the present system began. Yet these second battalions would have very many advantages over them.

83.—Such then is the organization I venture to propose. An army does not exist simply to hold certain stations, but exists to take the field—in a word, *to mobilise*. The change I have proposed has this for its object, and, though an immense one in all that means preparation for war, is a very remarkably small one in all else. It has throughout been a main endeavour to limit all change as regards the *personnel* to the utmost, and this is confined simply to the change among the officers, *i. e.*, the increase of eight British and reduction of 10 Native officers in every two battalions.

It is a change which appears equally called for, whether we regard the matter from the point of view of fighting power on the battle-field, or from that of an efficient mobilisation, or from that of giving both the British officer and the Native officer better scope for the exercise of their respective abilities; a change, moreover, without which it is in my humble opinion expecting more than can fairly be expected of human nature, to hope that our Native infantry should be able to stand the strain which will be thrown upon them if taken against European troops.

84.—The organization I have thus imperfectly sketched out is one calculated, I submit, to cause a long service army to attain the very highest pitch of perfection ever attained by any army. The great advantage of short service is, of course, the large reserves produced, and so the enormous numbers able to be put in the field on mobilisation; but short service carries with it this one tremendous disadvantage, *viz.*, that the higher training can only be glanced at, and that on taking the field two-thirds of each battalion must be half trained reservists. Long service on the other hand, though it has the disadvantage of the fewer numbers able to be put in the field, has this great counterbalancing advantage, that those few can be brought to a pitch of perfection such as no short service army can dream of, and the battalions take the field without any reservists in their ranks.

This army is now unique in the world as the only long service army remaining, and we have therefore an opportunity of making it unique, also by the high pitch of efficiency attained; a result, moreover, which the very significant forecast I quoted in the early part of this paper from von Goltz shows to be well worth putting forth every effort to reach with reference to its bearing on the tactics of the future.

And though we are so fond of abusing ourselves and our arrangements, and though it may sound a rather "large order," *yet I am not at all sure that the Army of India would find it required any very immense effort to be actually the very first among all armies in the race of efficiency for war.*

The proposed reorganization of our Native infantry is one contribution towards the above object, which seems to me more urgently required both as regards the size of the force involved and the important part it has to play, than any other portion of this wide subject. And surely *no* difficulties should be allowed to stand in the way when one recognizes that the fighting power of the whole is so largely increased. And, in stating that it *would be* thus increased, I appeal to the officers of the army who are personally acquainted with this great and honourable branch of it to corroborate me, including, Sir, yourself, who have made *all* branches of this great army your own for now no less than 40 years.

Lieutenant-Colonel Meiklejohn, 20th Punjab Infantry: Your Excellency, Ladies, and Gentlemen. We have all, I am sure, heard with great interest Colonel Young's very able lecture.

There is no doubt that should we have to fight an European enemy, more British officers would be required in our Native infantry regiments. Regarding this there can be I imagine, no difference of opinion.

I made a suggestion to Colonel Young to-day, that the supreme command of both the first and second battalions in his scheme should devolve on the officer in command of the first battalion, and not upon an outsider such as the officer commanding the station. No officer not in the regiment could be a competent judge of, or take the same interest in, many regimental subjects.

For instance, it is proposed that all recruiting for the regiment should be done in the second battalion. No commanding officer who was worth anything would submit to have no voice in the recruiting of his regiment. I look upon the recruiting of the native army as the most important of all subjects in connection with it I think therefore, that the officer in command of the first battalion should command, and be responsible for, the efficiency of both battalions, and that he should have superior rank and staff allowances to the officer commanding the second battalion. I would suggest that the officer commanding the first battalion should be a Colonel and the officer commanding the second battalion a Lieutenant-Colonel, or that the former should be a Lieutenant-Colonel and the latter a Major.

Colonel Young has said that he considers that the second battalions of regiments organized as he proposes would be quite as efficient as regiments are now under the present system. In this I think he takes rather a sanguine view. According to his scheme these second battalions are to be employed in Asiatic warfare. For nearly 30 years in all frontier expeditions in which any fighting has been expected additional British officers have been attached to regiments proceeding on service. Yet it is now proposed to send battalions almost entirely commanded by native officers to the front. It is probable that these second battalions would, on active service, have to be very largely supplemented by British officers from their first battalions. These are, however, perhaps minor points, and I think we should feel obliged to Colonel Young for bringing the subject forward in his very interesting lecture.

As a commandant of a native infantry regiment, I take the greatest interest in the subject, and have therefore made the above few remarks on a matter in which I have had some little experience.

The Proceedings terminated with a vote of thanks to the Lecturer, proposed by H. E the Chairman.

Note on COLONEL YOUNG'S *lecture by* COLONEL F. LANCE, C. B.

As I think it probable that exception may be taken to that part of Colonel Young's scheme that places great power and responsibility in the hands of the Native officers of the regiments of the second line, especially by officers whose personal knowledge of the Native army is comparatively recent, a few remarks on this point may be useful.

Previous to the Mutiny the Native officer of the regular army was generally speaking a superfluous nonentity Promoted almost entirely by seniority in a service in which the soldier almost invariably served till he was invalided, he seldom obtained a commission till he had reached an age, when, if not past work, he was, from long service in subordinate posts, incapable of assuming the position and authority of a Native officer, and the presence of a British officer in command of the company necessarily cramped any energies that might have remained to him.

After the annexation of the Punjab, an entirely different system was developed in the regiments raised on the irregular system for service on the new frontier. Here, with only three British officers per regiment, the Native officer, sprung from a more vigorous race, in many cases of good family, and never having served in the ranks, assumed the power and authority which the position of a *bonâ fide* company commander demanded.

That after the Mutiny the Native army was remodelled on the irregular system, is the best proof that the Native officer under this system had proved a success, and this fact was fully testified to by those who witnessed their devoted and gallant services in those trying times.

The gradual addition of British officers since the first introduction of the irregular system, which was considered necessary to carry out the elaborate training now required of the Native soldier, has materially affected the position of the Native officer, and has curtailed his powers.

This, combined with long routine service in cantonments, has caused his position to approach somewhat to that of the Native officer of pre-Mutiny times.

As much is not now expected from the company Native officer, possibly less care is taken in selecting him, claims of seniority are allowed to have too much weight, and opportunities are not so frequently given for the exercise of independent power, either in the lines or on parade. It is therefore not surprising that, when suddenly called on to exercise independent judgment and authority on field service, the Native officer of the present day should fall short of the expectations that had been formed of him from the experience of past times.

The system that brought to the front in the Mutiny such men as Ressaldars Mahomed Khan of the Guides Cavalry, Jai Sing of the 1st Punjab Cavalry, Bishen Sing and Punjab Sing of the 2nd Punjab Cavalry, Jaffir Ali of the 3rd Punjab Cavalry, and Subadars Mir Jafir Ali and Habib Khan of the 1st Punjab Infantry, is undoubtedly capable of producing efficient company commanders in the present day. It was the opinion of some officers who had witnessed the work of Native officers in those times, that they were worthy to occupy far higher posts in the army than any to which they have yet attained: among those who held this opinion was Sir Dighton Probyn, who had had full opportunities of judging what Native officers were capable of.

If the estimation of the capabilities of Native officers does not stand as high now as it did formerly, it is owing rather to want of opportunity of practising and displaying their powers than to any deterioration in the class itself.

When Native officers have been accustomed to exercise independent command, they have worked as creditably in recent times as they have ever done. During the Afghan war, a line of communication was formed, on which parties from at least four different regiments of Native Cavalry were employed. Posts had to be built, supplies collected, villagers kept in hand, and marauding parties dealt with.

The officer commanding this line found a marked difference in the work of parties from regiments of Punjab Cavalry and of those from other regiments. As these men were drawn from much the same classes, the difference must be attributed solely to the experience of independent command gained on the frontier by one body of men, which the other had had no opportunity of acquiring.

Later still I remember at Dera Ismail Khan about 1884, a Subadar of the 1st Punjab Infantry was in command of the Girni outpost garrisoned by cavalry and infantry. A flock of sheep and goats numbering many hundreds had been raided, and were being driven over the hills near the post. Sending off the infantry of the post across the hills, which were very precipitous, the Native officer gallopped with the cavalry to the Tánk Zám Pass some four miles off, and going up the Pass succeeded, with the fire of the dismounted cavalry, in holding the raiders in check until the infantry came up, and driving off the raiders recovered the flock.

Although the powers of the Native officer of the present day to exercise efficient command may have been called in question, no one I think doubts his gallantry and devotion. The spirit of the gallant Subadar of the 4th Punjab Infantry, who at the assault in the Sicundra Bagh, thrust his hand into a hole in the door of the gateway to lift the latch from the inside, and when wounded by a sword cut calmly withdrew it, and, putting in the other hand, opened the gate and let in his storming party, still exists, and requires only proper training and opportunity to bring it out.

I submit therefore, that the Native company commander with extended duties, and under less control than he is subjected to under the present system, cannot be urged as an objection to Colonel Young's scheme. Careful selection and training, considerate treatment, and I think the introduction of more Natives of good family with direct commissions, will no doubt be necessary, but with attention to such details, I feel confident that the system on which Colonel Young proposes to officer the regiments of his second line would prove successful, and that it would develope qualities in the company commanders, which officers, who know the Native officer only in his present contracted sphere of duty, can hardly realise.

The Tables.

A.—Shows the establishment of the proposed double-battalion regiment in peace and in war.

B.—Details the non-commissioned officers and men of two existing battalions and of the double-battalion regiment, showing the small amount of change among these.

C.—Shows the comparative number of officers and non-commissioned officers in the existing and the proposed organization.

D.—Comparative cost of (I) two existing battalions, and (II) the double-battalion regiment (with proposed rates of pay in latter); showing that the increased expense for each pair of battalions so converted is Rs. 33,360 per annum.

E.—Shows how the existing 64 battalions of the Bengal army stand as regards classes.

F.—Shows three alternatives as regards the number of double-battalion regiments proposed, with the cost of each alternative.

H.—Losses at Chillianwala, 13th January 1849.

Table A.

Establishment of proposed double-battalion regiment in peace and in war.

IN PEACE.

1st Battalion.		*2nd Battalion.*	
1 Lieut.-Colonel... 1 Major ... ... 8 Captains ... ... 10 Lieutenants ...	20 British officers.	1 Lieut.-Colonel... 1 Major ... ... 2 Lieutenants ... (Adjt. and Qr. Mr.)	4 British officers.
1 Subadar Major.. 1 Jemadar Adjt... 1 Jemadar Qr. Mr.	3 Native officers.	1 Subadar Major.. 8 Subadars... ... 10 Jemadars † ...	19 Native officers.
8 Company Havildar Majors ... 40 Havildars... ... 48 Naicks ... ... 16 Drummers ... 800 Sepoys	912* N. C. officers and Sepoys.	40 Havildars... ... 40 Naicks ... ... 16 Drummers. ... 800 Sepoys	896 N. C. officers and Sepoys.
(8 Companies of 100 privates.)			

IN WAR.

1st Battalion.		*2nd Battalion.*	
Same as in peace ...	20 British officers.	Same as in peace ...	4 British officers.
Same as in peace ...	3 Native officers.	Same as in peace ...	19 Native officers.
Non-Commd. officers and Drummers same as in peace. 928 Sepoys (including 128 received from 2nd Battn.).	1040 N. C. officers and Sepoys.	Non-Commissioned officers and Drummers same as in peace ... ... 1072 Sepoys*... ...	1168 N. Co.'s and Sepoys.
(8 Companies of 116 privates.)		*(Including reservists.)	

---

* A Band Havildar, a Naick as Drum-Major, and two Bandsmen per Company included in these.

† One Jemadar Adjutant and one Jemadar Quarter Master included in these.

Table B.

Comparison of the non-commissioned officers and sepoys in two existing battalions and in a proposed double-battalion regiment; showing the small amount of change involved.

(*a.*)—Two existing battalions as they stand at present

37th Dogras.		*38th Dogras.*	
40	Havildars	40	Havildars.
40	Naicks	40	Naicks.
16	Drummers	16	Drummers.
800	Sepoys	800	Sepoys.
Total... 896		Total... 896	

(*b.*)—The same formed into a double battalion regiment (in peace.)

1st Battalion.		*2nd Battalion.*	
48	Havildars	40	Havildars.
48	Naicks	40	Naicks.
16	Drummers	16	Drummers.
800	Sepoys	800	Sepoys.
Total... 912		Total... 896	

(8 Havildars and 8 Naicks permanently added in 1st battalion.)

(*c.*)—The same on mobilisation taking place (for war.)

1st Battalion.		*2nd Battalion.*	
48	Havildars	40	Havildars.
48	Naicks	40	Naicks.
16	Drummers	16	Drummers.
928	Sepoys	1072	Sepoys (including reservists)
Total.. 1040		Total... 1168	

(128 Sepoys given by 2nd battalion to 1st battalion.)

in the proposed organization.

IZATION.

1.		Whole Regiment.		
1 1 2	4	Lt.-Colonels ... 2 Majors ... 2 Captains ... 8 Lieutenants .. 12		24
1 8 0	19	Subadars... ... 10 Jemadars ... 12		22
s	23	Total Officers		46
0 0	80	Company Havil- dar Majors ... 8 Havildars ... 80 Naicks 88		170
d ..	103	Total officers and non-commissioned officers		222

proposed organization.

Comparative cost of two existing battal
N. C. Officers only taken, as the pri

I.

Cost of existing organization

Cost of one existing battalion, (British of average ranks.)

1 Lieut. Colonel ... ...
1 Major 2nd in Comd. ... ...
1 Major Wing Comdr. .. ..
2 Captains @ Rs. 474 ... ...
3 Lieutenants @ Rs. 325 ... ...
Staff pay to Adjutant ... ...
Staff pay to Quarter-Master ... ...

British officers Rs. ..

1 Subadar Major	Rs.	150
3 Subadars @ Rs. 100... ...	,,	300
4 Subadars @ ,, 80... ...	,,	320
1 Jemadar Adjutant	,,	67
3 Jemadars @ Rs. 50 ...	,,	150
4 Jemadars @ ,, 40 ...	,,	160

Total, officers Rs. ...

40 Havildars @ Rs. 14	Rs.	560
40 Naicks @ ,, 12	,,	480
Staff pay. 8 Pay Havildars @ Rs. 5...	,,	40
8 Color Havildars @ ,, 2...	,,	16
1 Drill Havildar	,,	5

Total, officers and N. C. Officers, Rs.

N. B.—The increased cost on each p

Table D.

ions and of a double-battalion regiment; showing the increased expense for each pair of battalions thus converted. Officers and vates are the same in both cases. Contract allowances and Medical Officers pay the same in both cases and are therefore omitted.

(PER MENSEM.)		II. COST OF PROPOSED ORGANIZATION (PER MENSEM).				
ficers at	(X.) Cost of two existing battalions.	Cost of 1st battalion (with proposed rates of pay).		Cost of 2nd battalion (with proposed rates of pay.)		(Y.) Cost of whole regiment.
Rs.	Rs.		Rs.		Rs.	Rs.
1,428		1 Lieut. Colonel	1,428	1 Lieut. Colonel	1,428	
910		1 Major 2nd in Comd. Rs. 640+300 ...	940	1 Major 2nd in Comd. 640+230	870	
870		8 Captains @ Rs. 374+200=574 ...	4,592	2 Lieutenants @ 225+100	650	
948		10 Lieutenants @ Rs. 225+100=325 ...	3,250	Staff pay to Adjutant	100	
975		Staff pay to Adjutant	100	Ditto to Quarter-Master	50	
100		Staff pay to Quarter-Master	50	Office Allowance to Qr.-Mr.	30	
50		Office Allowance to Quarter-Master ...	30			
5,281	10,562	British Officers Rs. ...	10,390	British Officers ... Rs.	3,128	13,518
1,147	2,294	1 Subadar Major @ ... ... Rs. 300	446	1 Subadar Major @ ... ... Rs. 150	1,365	1,811
		1 Jemadar Adjutant @ ... ... „ 76		4 Subadars @ Rs. 100 ... ... „ 400		
		1 Jemadar Quarter-Master ... „ 70		4 Subadars @ „ 80 ... .. „ 320		
				1 Jemadar Adjt. @ Rs. 50+25 .. „ 75		
				1 Jemadar Qr.-Mr. @ Rs. 50+20 „ 70		
				3 Jemadars @ Rs. 50 ... ... „ 150		
				5 Jemadars @ „ 40 ... ... „ 200		
6,428	12,856	Total Officers Rs. ...	10,836	Total Officers ... Rs.	4,493	15,329
1,101	2,202	8 Coy. Havildar Majors @ Rs. 32. Rs. 256	1,408	Non-Commissioned Officers as in No. I,	1,101	2,509
		40 Havildars @ Rs. 14 ... ... „ 560				
		48 Naicks @ Rs. 12 ... ... „ 576				
		Staff pay to 8 Naicks as pay assistants @ Rs. 2 ... „ 16				
7,529	15,058	Total Officers and N. C. O's. Rs. ...	12,244		5,594	17,838

air of battalions so converted is therefore the difference between Column X. and Column Y., or Rs. 2,780 p.m., or per annum Rs. 33, 360.

Table E.

The existing 64 battalions of the Bengal army showing how they stand at present as to classes.

(A.) Special Corps.		(B.) Ordinary Corps.	
Guides Infantry	1	Punjab Battalions	29
Pioneer Battalions	3	Goorkha Battalions	10
Assam Battalions	3	Garhwali Battalion	1

N.B.—The cost in the existing organization of depôt centres and depôts in war might also f
be set off against a part of that shown below, and so reduce it a good deal.

Four alternatives as

I. With 28 Double-Battalion Regiments and 8 Special Corps.					II. With 28 Double-Battalion Regim (1 Existing Battalio	
Double-Battn. Regiments proposed.	Class.	Number of battalions required.	Special Corps.	Total.	Double-Battn. Regiments proposed.	Class.
15	Punjab	30	8	64	15	Punjab ... ...
6	Goorkha	12			6	Goorkha ... ...
7	Hindustani ...	14			7	Hindustani ...
28	Totals ...	56	8	64	28	Totals ...

Increased cost per annum.	*Increased cost per*
28 pairs of battalions converted to D. B. Regiments, at Rs. 33,360 each. = Rs. 9,34,080	28 pairs of battalions converted Rs. 33,360 each. Less cost of 1 existing battalion Ba

airly

Table F.

Special Corps.

(Either 7 or 8 as the case may be.)

Guides Infantry	1	7	8
Pioneers	3		
Assam	3		
One other battalion	1		

regards the number of double-battalion regiments to be formed.

ents and 7 Special Corps. n reduced).			III. With 27 Double-Battalion Regiments and 8 Special Corps. (2 Existing Battalions reduced.)					IV. With 27 Double-Battalion Regiments and 7 Special Corps. (3 Existing Battalions reduced.)				
battalions required.	Special Corps.	Total.	Double-Battn. Regiments proposed.	Class.	Number of battalions required.	Special Corps.	Total.	Double-Battn. Regiments proposed.	Class.	Number of battalions required.	Special Corps.	Total.
30	7	63	15	Punjab	30	8	62	15	Punjab	30	7	61
12			6	Goorkha	12			6	Goorkha	12		
14			6	Hindustani ...	12			6	Hindustani ...	12		
56	7	63	27	Totals ...	54	8	62	27	Totals ...	54	7	61

annum.

to D.B. Regiments at

Rs. 9,34,080

reduced,... Rs. 2,64,000

lance .. Rs. 6,70,080

Increased cost per annum.

27 pairs of battalions converted to D. B. Regiments, at Rs. 33,360 each.

	Rs. 9,00,720
Less cost of 2 existing battalions reduced	Rs. 5,28,000
Balance ...	Rs. 3,72,720

Increased cost per annum.

27 pairs of battalions converted to D.B. Regiments, at Rs. 33,360 each.

	Rs. 9,00,720
Less cost of 3 existing battalions reduced...	Rs. 7,92,000
Balance ...	Rs. 1,08,720

TABLE H.

Losses at Chillianwála, 13th January 1849.

Infantry.			Artillery, Cavalry, and Staff.		
Corps.	*Officers.*	*Men.*	*Corps.*	*Officers.*	*Men.*
* 24th Foot	23 ...	597	Staff	8 ...	...
29th Do.	4 ...	237	Bengal Artillery, 8 Batteries	4 ...	57
61st Do.	3 ...	111	3rd Light Dragoons ...	2 ...	38
2nd Bengal Europeans	2 ...	65	9th Lancers	0 ...	12
15th Native Infantry ...	4 ...	52	14th Light Dragoons ...	2 ...	17
25th Do.	12 ...	192	1st Bengal Light Cavalry	1 ...	8
* 30th Do.	21 ...	264	5th Do.	3 ...	19
31st Do.	1 ...	17	6th Do.	5 ...	12
36th Do.	9 ...	96	8th Do.	0 ...	10
45th Do.	5 ...	74			
46th Do.	3 ...	61			
* 56th Do.	18 ...	304			
69th Do.	2 ...	65			
70th Do.	2 ...	23			

* Pennycuick's Brigade.

Dealing first with temperature, the means are obtained from three observations a day *viz.*, the observations of the minimum thermometer and those taken at 10 A.M. and 4 P.M., and having been duly corrected the net results are those shown in the following table:—

Months.	Mean temperature of the different months.			Sums	Means	Simla ... ...
	1884...	1885...	1886 .			
January.	...	32·4	35·4	67·8	33·9	40·7
February.	...	36·3	27·6	63·9	31·95	41·3
March.	...	47·9	47·3	95·2	47·6	51·0
April.	...	53·1	56·6	109·7	54·85	59·6
May.	...	65·0	70·5	135·5	67·75	64·7
June.	...	70·9	82·1	153·0	76·5	68·2
July.	...	75·2	82·4	157·6	78·8	65·1
August.	...	81·8	84·3	166·1	83·05	63·8
September.	...	70·5	71·1	141·6	70·8	61·9
October.	66·1	54·5	58·3	178·9	59·63	56·7
November.	48·9	51·8	...	100·7	50·35	50·0
December.	40·0	37·8	...	77·8	38·9	45·8
					57·8	55·7

THE CLIMATOLOGY OF AFGHANISTAN,

BY W. L. DALLAS, ESQ., Meteorological Department,
Government of India.

The department of the Government of India to which I have the honour to belong concerns itself more especially with peaceful affairs. It is when the sword has been turned into the ploughshare that the sphere of usefulness of the meteorological department is most enlarged, but, nevertheless, the weather affects soldiers and civilians alike, and from earliest historical time meteorological phenomena have often had an important influence on warlike operations. It is on this account that I venture to lay before the United Service Institution of India the following synopsis of the climatology of Afghanistan. At any time Afghanistan may become the seat of extensive military operations, so that though soldiers are popularly supposed to be indifferent to the warfare of the elements, a knowledge of the weather which will probably be experienced in Afghanistan in the event of that country becoming the seat of war, may save many valuable lives.

In order to explain clearly the figures which I am about to place before you, I must first describe shortly the marches which were made by various Officers of the Afghan Boundary Commission, to whom I am indebted for the information I have worked up in the present paper. In the first instance observations commenced in the Halmand Valley in October 1884. The observations were than recorded at many small places in the neighbourhood of Herat until the beginning of December, when the Commission went into camp at Bala Murghab on the Murghab near the northern boundary of Afghanistan.

The following is a statement of the more considerable halts of the Officer who took the observations :—

Bala Murghab	December	12th 1884	to	February	14th 1885
Panjdeh	February	23rd 1885	to	March	30th 1885
Tirpul	April	27th 1885	to	May	17th 1885
Sinjao	May	24th 1885	to	June	17th 1885
Zindijan	July	31st 1885	to	August	13th 1885
Sangbast	August	14th 1885	to	September	2nd 1885
Ulang-i-Afghan	September	3rd 1885	to	September	16th 1885
Mashad	October	6th 1885	to	October	20th 1885
Zulfikar	November	10th 1885	to	November	26th 1885
Maruchak	December	18th 1885	to	December	29th 1885
Charharshamba	January	8th 1886	to	March	24th 1886
Karawal Khana	March	25th 1886	to	April	19th 1886
Charhar Shamba	April	24th 1886	to	May	6th 1886
Khamiab	May	28th 1886	to	July	22nd 1886
Shadian	July	27th 1886	to	August	28th 1886
Khamiab	September	5th 1886	to	September	14th 1886
Kabul	October	15th 1886	to	October	23rd 1886

The intermediate dates were filled up by short marches in the intervening regions. There are thus available twenty-five months' observations for deducing the means.

Dealing first with temperature, the means are obtained from three observations a day *viz.*, the observations of the minimum thermometer and those taken at 10 A.M. and 4 P.M., and having been duly corrected the net results are those shown in the following table:—

Months.		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
Mean temperature of the different months.	1884...	...	...	...	...	...	...	...	...	...	66·1	48·9	40·0	
	1885...	32·4	36·3	47·9	53·1	65·0	70·9	75·2	81·8	70·5	54·5	51·8	37·8	
	1886	35·4	27·6	47·3	56·6	70·5	82·1	82·4	84·3	71·1	58·3	...	..	
Sums		67·8	63·9	95·2	109·7	135·5	153·0	157·6	166·1	141·6	178·9	100·7	77·8	
Means		33·9	31·95	47·6	54·85	67·75	76·5	78·8	83·05	70·8	59·63	50·35	38·9	57·8
Simla		40·7	41·3	51·0	59·6	64·7	68·2	65·1	63·8	61·9	56·7	50·0	45·8	55·7

From the line of means it will be seen that the coldest month is February with a mean temperature very slightly below freezing point, and that the warmest month is August, with a mean temperature of 83°. This gives a range of just about 50° for the temperatures of the whole year, and the mean temperature is 57°·8. For the sake of comparison the monthly and annual mean temperatures of Simla have been placed below those for Afghanistan. The mean annual temperature of Simla is only 2° lower than that of Afghanistan. In Simla the coldest month is January and the hottest June, and the range is 28°, so that the range of temperature to be endured in Afghanistan is about twice as great as that in Simla, the heat being much greater in summer and the cold much greater in winter. Any one who, after some years passed on the plains of India, is called on to winter in Simla, will be able to understand to a certain extent the sort of feelings with which our soldiers will appreciate a winter in Afghanistan with a mean temperature of about 10° lower.

Mean temperatures, though exceedingly useful for the determination of general conditions, fail in giving a complete idea of the climatology of a given country. It is large extremes of temperature which play havoc with our constitutions and health. Steady cold and steady heat may to a considerable extent be counterbalanced by suitable clothing and arrangements, but it is extremely difficult to adequately guard our bodies against large changes of temperature, more particularly when these changes occur in quick succession. From this point of view the climate of Afghanistan is in some months of the year distinctly trying. A diagram is given which shows graphically the mean daily range of temperature in the different months.

The least daily range is in the cold weather, the greatest in the hot; and accepting 30° as being an excessive range, the diagram shows that for seven months of the year, viz. from May to November, this range is exceeded. If we could compare our feelings when the thermometer marks 30° or 2° below freezing with our feelings when the thermometer marks 60°, or as it is called on the thermometer scale "temperate", we could imagine the climatic difference which is passed through each day during the seven months quoted above. Of course where houses or huts are available, this range of temperature is, for practical purposes, reduced, because the walls absorb heat during the day and give it out slowly during the night, but where troops are in tents or bivouacing out in the open, this range of temperature will be experienced. In a long campaign good health is more important then good shooting, and in order to avoid chills with all their concomitant disorders, suitable precautions must be taken to provide for this range.

So far we have been dealing wholly with monthly means which are made up of the various and often largely varying readings which have been recorded during the different months. Turning now to individual temperature readings, we find extremes of cold and heat and changes of temperature which are only faintly indicated in the mean figures. In January 1885, when the observations were recorded at Bala Murghab, and in January 1886, when the observations were recorded at Charhar

Shamba, the following large variations of temperature were observed. The two places are only a few miles apart, and we may take it that the observations very fairly represent the climate of northern Afghanistan.

	Min.	10 A.M.	Max.	4 P.M.
On the 9th Jan. 1885	0	7·5	21	17·2
„ 25th „	38·0	43·3	56·5	54·2
„ 28th „	4·5	9·4	22·2	20·2
„ 31st „	30·5	40·2	54·0	53·0
„ 9th Jan. 1886	32·0	47·0	52·0	44·0
„ 26th „	6·0	26·0	32·8	20·0
„ 31st „	5·0	10·0	21·0	14·5

These figures show with great clearness the remarkably large variations of heat and cold which may be experienced in this month. Taking the two ninths, the observations show that we may have a minimum temperature of zero or of 32°; a 10 A. M. temperature of 7°·5 or of 47°·0; a maximum temperature of 21° or of 52°; and a 4 P. M. temperature of 17°·2 or of 44°. The other days exhibit similarly large variations, so that our troops must be prepared, if wintering in Afghanistan, to withstand days on which the mean temperature is only 9°·5 or 22°½ below freezing, as well as days in which the mean is 46°·2 or relatively mild. In February the weather is even more severe. February 1885 was passed partly at Bala Murghab and partly at Panjdeh, and February 1886 at Charhar Shamba. The following were the temperatures recorded on the 1st February in each year:—

	Min.	10 A.M.	Max.	4 P.M.
On Feb. 1st 1885	38·5	41·4	43·0	41·4
„ „ 1886	12·0	12·0	15·0	15·0

These figures show that on the 1st of February one may experience a mild day with a range of only 5°, extending from 38° to 43°, or one may have to endure a cold of 12° below zero and a maximum 17° below freezing point. Waves of intense cold occur during this month, lasting for two or three days, during which the temperature falls below zero, and the day temperatures seldom rise above freezing point. Also Charhar Shamba appears to be an exceedingly cold station, unless the weather of 1886 was altogether exceptional, as the mean minimum for February at that place was only 17° and the mean maximum only 38°. The cold of parts of Afghanistan during the winter may be estimated from one fact among others, that in the east of the Hari Rud the river is frozen hard, rapids and all, and the people travel on it as on a road, while snow lies from four to six months.

In March the weather becomes milder and the day temperatures exceed 70°, but waves of cold though less common than in January and February, are not unknown, and with troops out in the open may be attended with disastrous results. At the end of March 1886 one of these waves occurred, and the temperature on the 30th and 31st was as follows:—

	Min.	10 A.M.	Max.	4 P.M.
30th	1·0	18·0	28·4	27·3
31st	3·8	27·0	31·0	26·4

Considering that on the 26th and 27th March or three days previously the maximum had reached 60°, and on the 28th 49°, and that on April 1st it rose to 45°, on the 2nd to 55°, and on the 3rd to 62°, it will be obvious how seriously a fall such as that given above might affect the health of a body of men exposed to it without adequate protection.

During April, May, June, July, and August, the temperature steadily rises and though considerable oscillations are still recorded, and the average daily range is larger than that in the earlier months, the centre of interest changes during these months from the minimum to the maximum temperatures. In April the highest maximum recorded was 82°; in May 101°·6; in June 109°·8; and in July 110°·5. August was passed at the hill station of Shadian, and the maximum temperatures there are not comparable with those on the plains.

In September the temperature begins to fall, and the maxima decrease from 104° at the beginning of the month to about 87° at the end. Quite at the close of the month frost begins at night, so that the daily range is large, but the sudden large changes of temperature noticed in the spring, and which are associated with the appearance of storms, do not occur in the autumn. During October the maximum temperatures vary between 60° and 80°, and frost at night is very frequent In November the winter commences, and the changes of temperature are very large. The day temperatures range between 60° and 70°; while the night temperatures are very low, the minimum on one occasion falling to 14°. These changes of temperature accompany changes in the wind direction. When a southerly wind blows the days are warm and fine, but a bitter northerly wind occasionally sets in, and both days and nights are cold and unpleasant. In December the weather is similar to that in November, only colder, cloudier, and more unpleasant. Temperatures as low as 2° were recorded on some nights, and the maxima were below 32° on several days. On the contrary, on some days the maxima exceeded 65°, and the days were mild, though the nights were always cold.

We now turn to the wind observations. The winds in Afghanistan are much steadier than they are in India. Afghanistan being outside the influence of the monsoons, there does not occur there that reversal of the wind currents which is so noticeable in India. For all the months of the year the average direction of the wind is from some northerly point, and generally from between north-west and north-east. During the winter and spring months and again in the autumn, the wind is unsteady in direction and calms are numerous, but from May to September the wind is very steady from a point a little to the west of north. The latter winds are somewhat similar to the hot winds of northern India, and are known to the Afghans as the *bád-i-sad-o-bist-roz* or wind of 120 days. This would indicate that the wind lasted from about the 15th of May to the 15th of September, but as a matter of fact, these hot strong winds do not last much beyond the 1st of September. The wind blows right across Afghanistan, and is felt in all its fury in Sistan. It usually commences at about 10 A. M., and lasts till 5 or 6 P. M., during which time the temperature in open tents is as much as 109° or 110°.

As soon as the wind ceases temperature falls and the nights are cool. Just as in India a shower on the hills is accompanied with an increase in the strength of the hot winds in the Gangetic plain, so when a shower occurs among the hills which border the Hari Rud, the wind increases to a gale of such strength as to render it difficult to keep tents standing. One result of this wind is the dusty hazy air which characterises the greater part of Afghanistan during the summer season. The change to dusty hazy weather takes place very quickly. Towards the end of May the country is ordinarily wet and sloppy from the effect of the spring rainfall, but after a day or two of the hot winds dust begins to rise and the weather to get hazy, and on the plains and in the valleys it is very thick with dust till the end of October. The camp of Shadian was above the level of the dust, and the observers looked down on the dense hazy air below, but in the previous August the remarks of the observers constantly refer to the thick dust haze which prevails, and this lasts until September, and indeed in Sistan sometimes into October. During these months distant signalling would be practically impossible.

As an indication of weather changes the wind is invaluable, where the influence of hills and valleys is not felt. For example, for several days in December 1884 and January 1885 (at Bala Murghab) the wind had been steadily northerly, when suddenly, early in the morning of the 5th it shifted to south-south-west, and heavy snow fell from noon on 5th to 9 A. M. on the 7th, after which the wind returned to north-north-west. Again on the 21st the wind, which had been northerly for several days, shifted at 10 A. M. to south-south-west, and snow fell till midnight on the 22nd. Similar changes could be given for several other occasions during the winter. During the prevalence of the southerly wind the weather is fine, but it is none the less an indication of approaching snow. In the spring and summer on the contrary, the rainfall seems to accompany a change in the contrary direction, and the rainy periods were preceded by a sudden strong northerly wind, and the clouds work up from north. The east wind brings the finest weather, but in the winter which is the season during which this wind is ordinarily experienced, the weather is always intensely cold. This easterly wind is probably part of the anti-cyclonic circulation connected with the high pressure area over Central Asia, and, hence, blows from a place of great dryness and great cold.

The next point to be considered is the effect of the storms on the weather in Afghanistan. It must be remembered that Afghanistan experiences what may be best described as a temperate zone climate. It is quite out of the influence of the monsoon, and its weather is similar to that which is experienced in the Mediterranean, so far as the seasonal changes go. Thus the winter is the period of storms; the spring, of varying weather, sunshine, and showers; the summer, of hot weather with occasional thunderstorms; and the autumn, of fine settled weather. Of summer storms it is unnecessary to speak at length. They are ordinarily simply hill thunderstorms, the indications of which must be learnt on the spot; but in July 1874 a storm occurred of a much more severe character. On this occasion snow fell for eight hours from about 9 A. M.

to 5 P. M., and when it ceased, was nearly three feet deep. The snow did not lie long, but its occurrence in the very middle of the summer is certainly a remarkable event. The winter storms are on the whole a more interesting subject of discussion. They appear to be disturbances which travel along in the upper westerly current which characterises the temperate zone. They may reach Afghanistan from almost any distance to the westward end. They certainly appear to pass on from Afghanistan into north-west India. In this respect I differ from my friend Mr. Blanford. That gentleman held that India was meteorologically a self-contained country, and maintained that all its meteorological phenomena were of indigenous growths; so these storms were attributed to evaporation from the Jhelum or something of that sort. Mr. F. Chambers, late Meteorological Reporter for western India, put forward the suggestion that these storms travelled into India from the westward, a suggestion, however, which was not endorsed by Mr Blanford.

Notwithstanding Mr. Blanford's dictum, I personally believe that these storms are, as mentioned above, disturbances travelling along from west to east in the upper current of easterly translation which prevails in the temperate region, and that for a proper anticipation of their approach they must be studied from this point of view.

One of these storms advanced across Afghanistan in the beginning of January 1885, when observations were being recorded at Bala Murghab. The following were the 10 A. M. and 4 P. M. observations at the time of occurrence.

	January 1st		January 2nd		January 3rd		January 4th		January 5th		January 6th		January 7th	
	10	4	10	4	10	4	10	4	10	4	10	4	10	4
Barometer	28·63	28·55	28·52	28·49	28·88	28·91	28·84	28·73	28·31	28·28	28·45	28·35	28·74	28·79
Temperature ...	37	43	37	42	32	31	30	31	31	34	33	35	26	24
Wind	calm	calm	calm	calm	N.N. W. 2	N. W 2	N. 1	calm	S. S. W.	calm	calm	calm	N.N. W.	calm
Weather	O	fine	O	O	O	O	O	O	O. D.	S.	S.	S.	S.	O

Colonel Maitland says of the 5th and 6th, "snowed heavily all day." The important points to be noticed here are, 1st, that the barometer was high between the 1st and the 3rd, and was highest on the afternoon of the 3rd, when the ordinary oscillation of pressure was reversed. After this hour the barometer fell, at first slowly and subsequently quickly, the fall between 10 A. M. of the 4th and 10 A. M. of the 2nd being 0·53″, a fall which is practically unknown in India; 2nd, there is the change of wind to south-south-west which preceded the snow by a few hours; and 3rd, there is the intense frost which followed.

The changes here shown are, however, apparently exceptional, as no other case of such a rapid fall and rise is disclosed by the observations. Although, however, in this case, the barometric changes are accentuated, the principle is the same in all cases of heavy snow. The barometer rises with a northerly wind or calms and light driving snow for some days, till it is above the normal average; it then falls suddenly with a shift of wind to south-west, south, or south-east, and the snow is heavy and the wind high. After the snow has fallen and the weather has cleared somewhat, temperature falls with great rapidity, and very low temperatures both day and night are experienced. This appears to be a well recognised fact, the popular belief being that the greatest cold is felt in spring, when there are violent and bitter winds. These occur after the snow is over. On these occasions the thermometer fully exposed to the sun does not rise much above 20°.

A tremendous storm occurred on the 4th of April 1885, when numerous men and animals and much baggage were lost, but unfortunately no one recorded any observations at this time, so that, though the wind is described as of extraordinary violence, the only available remark about the storm is that it came up from north-west. It is interesting to note that exceedingly unsettled weather prevailed in the Punjab between the 4th and 7th of April, and that at Quetta between the 4th and 6th the barometer fell nearly 0·2″, and about 2 inches of rain was registered.

In Afghanistan the first recorded indication of this storm was a high and bitterly cold wind, but the preceding days were cloudy and showery with occasional violent squalls of rain and hail, and there can be little doubt, that had the barometer been observed its readings would have shown a large fall. The wind during the storm was of extraordinary violence, so strong as to almost take men and animals off their feet, the cold was piercing and rain fell heavily. During the night it was with the greatest difficulty the tents were kept standing. The force of the wind never abated, and literally tore the tents to pieces, while the snow fell heavily all night. Three persons died in camp during the night, and the total loss from exposure was 10 men and several horses.

This account shows the effects of a fairly typical spring storm such as might occur in any year in Afghanistan during March or the early part of April. A storm of similar severity in winter would have been followed immediately by a period of intense frost, which would have killed every man and horse fully exposed to it. As it was, I suppose 3% of the whole body of the Commission died during that storm, so that we may form some notion of the havoc, which would occur, were an army on the march to encounter a similar experience. The only means of avoiding such a visitation is to watch the barometer and the wind direction; when the former after being high suddenly begins to fall, and when the upper clouds begin to travel quickly from south-east to north-west, preparations for bad weather should be made at once; and if these indications continue and intensify, the only thing left is to run to shelter as quickly as possible.

NOTES ON A JOURNEY TO TASHKENT AND BACK IN SEPTEMBER-OCTOBER 1890,

By Captain A. C. YATE,

29th Bombay Infantry (2nd Baluch Battalion).

It is not at all easy to get to Tashkent. With steamer and railway communication all the way from London to Samarcand, it may seem at first sight simple enough. The fact is though, you have to reckon with the Russian Government. Unless you have a special "permit" (a passport is no use) from St. Petersburg, you will not succeed in landing at Uzunada.—If you will open a book recently published, called "A Ride to India" by Mr. H. de Windt, and look at the first chapter, you will see that Prince Dondoukoff Korsakoff refused succinctly to let Mr. de Windt proceed onward from Tiflis to Central Asia. Numerous other instances might be quoted. I owe my visit to Tashkent to the fact that an Exhibition was held there last autumn. How it came to pass that we found the *Compagnie des Wagons-lits* at Paris advertising an excursion to Tashkent, and General Annenkoff undertaking to obtain the required permits from the Russian Government, is not quite clear. The keenness of Annenkoff to open up and develope Central Asia, and to make the Trans-Caspian railway a financial success accounts for his action; and as for the *Compagnie des Wagons-lits*, it was simply a speculation, an advertisement. The curious thing is that the Russian Government should have been drawn into sanctioning the relaxation of the rules regarding foreigners visiting Central Asia. Of the five persons who visited the Tashkent Exhibition under the auspices of the *Compagnie des Wagons-lits*, three were Englishmen (Lieut.-General Sir James Hills-Johnes, K. C. B., V. C., Mr. C. E. Biddulph, and myself), and the other two a French couple who turned back at Samarcand. The fact that the only persons who really profited by this permission to visit Central Asia were three Englishmen, was a result that was presumably unforeseen. The Russian draws the line at Orenburg, the Caspian, and the Russo-Persian border. We had a long and interesting conversation on this subject in the Club at Tashkent with Colonel Federoffski, an officer on the staff there. He said plainly, that in his opinion no Russian officer could visit India without incurring suspicion. Now consider how much less liberal minded in all matters affecting the freedom of the subject and the foreigner the Russian Government is than the British, and you will then understand why English officers are as a rule not even allowed into Central Asia at all.

Since I travelled across in July 1885 from Krasnovodsk to Baku, and thence viâ Tiflis and Batum to Constantinople, a good many alterations of military importance have taken place in the vicinity of that route. In September last (1890) my route was from Odessa *viâ*

Sebastopol, Kertch, Novorossisk, Batum, Tiflis, and Baku, to Uzunada. Odessa is not much better fortified now than it was in the Crimean War when a British squadron bombarded it. The living memorial of that bombardment is the round shot that carried away a corner of the Duc de Richelieu's monument. Now-a-days approach to Odessa would be blocked by mines, torpedoes, and such like emblems of the ingenuity of modern scientific warfare. It is out of the question for any Englishman to go into Sebastopol without feeling exceedingly interested, I might say almost enthusiastic, about it. This is the result of the great events of the past. Its importance in the present and for the future lies in the fact that its defences are now more formidable than ever, and it is now the arsenal and dockyard of the Black Sea. In a year or two all commerce is to be transferred to another port (Theodosia, I think), and Sebastopol is to become a military and naval station, *pur et simple.* No doubt at the time of the Crimean War some would have preferred to make Perekoff and Kertch the scene of our operations instead of Sebastopol (see "Episodes in a life of adventure", by Lawrence Oliphant, pp. 42-3.) Now Kertch is very strongly fortified and the entrance to the Sea of Azof blocked. There are only 17 feet of water in the narrow channel that connects Kertch harbour with the Sea of Azof. The trade of Kertch is a trans-shipping trade. The guns of the defences completely command the channel connecting the harbour with the Black Sea. A night attack, however, might achieve success.

In July 1885 there was much excitement about Batum. The fortifications had then not been long begun. We were then within an ace of war with Russia. This, I presume, is why I was allowed to walk all over the then incomplete works of the battery near the lighthouse. It was not until I had seen most of what there was to be seen, that a species of *gens d'arme* came up to me, and gave me to understand in a language that I did not then comprehend (presumably Russian), that I was trespassing I went away. A few guns were just being mounted then. Now the shore and the hills bristle with batteries. Mr. Peacocke, the British Consul, told me he was weary of the subject of the Batum fortifications. It is *un fait accompli.* So let us say no more about it. The town grows and the commerce increases daily. The oil reservoirs are a prominent feature in the landscape. From them a score or so of 5″ or 6″ iron pipes run the length of the breakwater, and pour oil into the tanks of steel steamers specially built for the oil trade. Behind the town rise the verdure-clad hills and mountains. On the 12th of October last year when we were some 70 miles out from Batum (bound for Constantinople on my return from Tashkent), we had a panoramic view of the lofty snow-clad mountains stretching from the Elburz range on the north to the mountains of Armenia on the south—a very fine sight, nothing visible but snow, the lower portions of the mountains being of course concealed from view.

When I ran from Batum to Baku on the 14th September last, the train passed over the steep gradient of the Suram Pass, one of the steepest in the world. On the 9th of October on my return, the train ran through the Suram tunnel. The powerful double Fairlie engines will be no longer required there. The line is a single one, and the pace of the mail about 16 miles an hour. The rolling stock appears to be ample for military purposes. I calculate that in the 800 vests (about 530 miles) from Batum to Baku, we passed in the 32 or 33 hours no less than 30 oil trains, each consisting of from 30 to 40 iron oil-tanks. We also passed two infantry troop trains containing a very good-looking lot of men. Military service wonderfully improves the Russian yokel, just as (Colonel Maurice tells us) it improves the lower classes of every nation. There is a good deal to be said in favour of conscription, even in Great Britain—especially if made applicable to the "unemployed" classes. Every man ought to contribute to the good of the state. If a man cannot contribute his quota as a civilian, he should do so by law in the ranks of his country's army.

Between 1885 and 1890 the Caucasian provinces have developed a good deal. The line to Novorossisk has been completed. Lines from Vladikavkas to Petrovsk and Tiflis are projected, have been surveyed, and are likely 'ere long to be commenced. The German writer whose essay on "Russia and Anglo-India" in the Militär-Wochenblatt has attracted such attention as to have been translated at least twice into English (in the United Service Magazine and in the Journal of the United Service Institution of India), asserts that the Armenian and the Caucasian have become merged in the Russian race. This is not at all the case, as anyone travelling in the Caucasus may find out for himself. The British Consul at Batum, with 20 years experience, holds that there is no love lost in the Caucasus towards the Russian. Very recently several allusions have appeared in the papers to the discontent prevalent among the Armenians, because the Russian Government are endeavouring to supplant the Armenian by the Russian language, and are enforcing other repressive measures against the Armenians. An Armenian in the Russian army can no longer rise to the rank of general. All these things tend to sever the Armenian from the Russian, and not to amalgamate the two. The sole aim of the Panslavonic policy is to merge and sink every alien element, German, Pole, Finn, Armenian, Caucasian, Tartar, &c. in the great Slavonic majority. It has by no means yet succeeded. The Caucasian is no more merged in the Slav than the German of the Baltic Provinces is.

This German "Military Study" on the position of Russia and England in Asia is most ably written, and it is especially worthy of note as being from the pen of a presumably unbiassed critic, but it contains a number of mistakes and incorrect assertions that are in the main due to the fact that the writer has not visited several of the countries and localities of which he treats. For instance he speaks of "hordes of Turcoman *cavalry*," of the country between the Caspian and Herat as "fertile," of the advanced Russian posts as being 175 kilometres or 120 miles from Herat (75 miles is more like the distance from Chihil Dukhtarán to Herat), &c. He says that the Shah has ceded Kalat-i-Nadiri to the Czar. This is not the case. Batum and Poti are said to be 24 hours by rail from Baku, 33 hours being correct. He confuses the Zulfikár Pass with the so-called Paropamisus. He quotes Wellington on Afghanistan, a country on which Wellington was not an authority. These are inaccuracies which, however, do not materially affect his arguments; they are only misleading to the ignorant. When, however, he states that Russian troops could be "quietly" collected at Herat and Mashhad to invade India, and makes other like assertions, he shews that he undervalues our Intelligence Service. Nevertheless it is a very able essay.

Baku has a population of about 50,000 now—the result of oil. The oil appears to be less plentiful than it was. In time it may be exhausted. That will be a bad day for the Caspian steamers and the Caucasian and Trans-Caspian railways, all of which are worked by this oil. Nothing has contributed so much to the progress of Russia in Central Asia as the discovery of this oil. Were it not there, wood and coal must have been brought from the Caucasus, Rostoff, and the Volga. From Uzunada to Samarcand no fuel exists. "Saxaoul" would soon have been exhausted. Baku and its oil has been a perfect godsend to the Russians in Central Asia. Now forests are being planted about Samarcand, Tashkent, and Kokand, and coal in quantities is being discovered. When the oil at Baku, Cheleken Island, and Bala Ishem fails, Turkistan will be ready to supply its own fuel.

Viewing the Trans-Caspian railway as a means of transport for troops, its weakest point is its present terminus at Uzunada. The harbour accommodation there is quite inadequate for the reception of the numbers of vessels that would (in the event of a concentration of troops in Trans-Caspia or Turkistan) crowd into it from Baku, Petrovsk, and Astrakhan. Far more troops can be poured in than can be simultaneously disembarked and railed away towards Merv and Samarcand. There is no room for a large standing camp, there is probably no adequate supply of fresh water. However, the Russian Government knows this, and it is evidently their intention to continue the line without delay to the excellent harbour of Krasnovodsk. The Trans-Caspian railway is fairly-well laid with a 5′ gauge. The mail trains average 15 miles an hour. It is estimated that at a pinch 8 to 10 trains daily can be run each way along this line. About every 22 or 23 versts there are crossing-stations. Sand at times blocks the line, and floods occasionally damage the earthwork and stop traffic, but not so far for long. It is worked and kept in order by two Railway Battalions. There is, however, really nothing new to say about this line, when experts like Colonel Le Mesurier and Major Peacocke have visited and reported on it. I by no means wish to undervalue the line, but I do protest against those who ridiculously exaggerate the difficulties that attended the making of the line (it was really a very easy line to make in many ways), and over estimate its working capacity. Russia in Asia in its true light is sufficiently formidable without any extra colouring being required. The director of the railway is General Annenkoff. His kindness to us throughout our journey merits the most hearty acknowledgement. We met him at Uzunada, Samarcand, Tashkent, and Bokhara, and everywhere he did something to help us. At Amu Darya on the 3rd October we spent an enjoyable morning with him, visiting his troops, schools, barracks, horses, &c., &c. However this was on our way back. I must try and keep to the sequence of time.

By Annenkoff's advice we went straight through from Uzunada to Samarcand. The climate of Samarcand in autumn is charming, though the sun is powerful by day. Broad roads, flanked by fine avenues of trees, and running streams permeate the cantonment, which is some three miles from the railway station. A strongish Russian fort dominates the native town. The summer barracks lie away on the Bokhara road near the station. They are of the lightest and simplest construction. None the less the Russian soldier that spends his summer in them is an uncommonly fine healthy hearty fellow. Any nation might be proud of the "food for powder" that I saw in Trans-Caspia and Turkistan. The officers, however, were, many of them, a poor lot. We had several opportunities of judging of these Russian troops, at Samarcand, Tashkent, Merv, Amu Darya, and elsewhere, and we all agreed in admiring the healthy cheery appearance and good physique of the men. While we were at Tashkent, a camp of exercise was being held at a place some 20 miles out on the Chinkent (Orenburg) road. Infantry and artillery were continually marching to and fro. It was by this road that the Russians in 1865 advanced on, attacked, and finally captured Tashkent. At Samarcand a force consisting of one regiment of three battalions of infantry (the 9th Turkistan), several sotnias of Cossacks, and one field and one mountain battery came in from Kalta Kurgan to join in the manœuvres under General Bibikoff, commanding at Samarcand. The manœuvres were to last a week and the General very kindly invited us to come out and see them, an offer that we regretted much at having to decline. The strength of each infantry battalion mentioned was four companies of about 75 men each with two or three mounted officers per company. Two ambulance carts, two pack-ponies with medical appliances, and five or six baggage carts followed each battalion. The regimental band preceded the leading battalion, the others having only drums and bugles. On the march, however, each company has its own rough music, one or two instruments of sorts, and singing. Bayonets are always fixed, and arms are advanced or sloped at drill. Movements are made in fours, sections, half-companies, and companies. On halting the men stand at ease without word of command.

Of the two batteries I saw marching in from Kalta Kurgan the field battery had four guns and four wagons, with six horses and three drivers to each, six gunners on limber and gun, and three on each wagon, with 12 or 16 mounted men. The guns have a pole instead of shafts. The mountain battery also had four guns, each drawn by two ponies. The gun is drawn on a good, and carried on a bad, road. The guns were very inferior to our mountain guns. There were four ammunition ponies per gun.

One of the most interesting and certainly the most trying part of our journey was the tarantass drive from Samarcand to Tashkent and back. What with dust, dirt, and cramped position, flies, bad food, heat by day and cold by night, it was not exactly enjoyment. In fact we might call it a temporary sacrifice of self with a view to subsequent compensation in the shape of a visit to Tashkent and its Exhibition. It was well worth while. Mr. Biddulph elected to remain at Samarcand while Sir James Hill-Johnes and I went on to Tashkent. What trouble we had in getting our vehicles to start with! The Russian postal officials are worthy rivals of the Oriental in the matter of prevarication. It is 190 miles from Samarcand to Tashkent. We took 36 hours going and 32 returning. M. Lessar with a special *podorojna* did it in 26 hours. The road from Samarcand to Tashkent may be divided into three sections, viz. (1) to Jizak about 60 miles, for about 15 miles through cultivation crossing the Zarafshan, and then through a desert tract and low hills; (2) Jizak to the Syr Darya ferry at Chinaz about 80 miles, a barren steppe the whole way ; (3) Chinaz to Tashkent 50 miles, cultivation all the way. The cold at night on the steppe, even at the end of September, was very unpleasant. I was very thinlyclad and felt it acutely. At the Exhibition at Tashkent I bought a wild catskin rug which kept me warm on the return journey.

It is most remarkable that the Russians take no trouble to improve this road connecting the capital of Turkistan with the terminus of the Trans-Caspian railway. Still, considering the bad state of the roads in Russia proper (you have only to keep your eyes open in the railway to notice it), this is not so surprising. When I was at Warsaw last August, and was going round to look at the fortifications, I noticed that the roads connecting the various works were not in goodorder, and one of the main roads became scarcely passable for wheeled vehicles as it approached the outskirts of thecity.

I have recently received information—and that on the very best authority, that the continuation of the railway from Samarcand to Tashkent has been commenced, as also the branch line from Dushakh to Sarakhs. However, in September-October 1890 we saw and heard nothing of this, when we were on the spot; and yet no sooner had I returned to Europe, than I was asked several times whether the report that these lines had been begun was true or not. I could only say that I had never heard a whisper of it—and there is nothing surprising in that. Annenkoff and Lessar would hardly unbosom themselves to us on those points. Indeed M. Lessar told me that he thought it probable that the first extension would be from Samarcand to Kokand. This I think improbable for at least two reasons, *viz.*, that Tashkent is the capital, and that it is on the direct line of connection with the projected Siberian railway, which will probably be ultimately carried out from Samarcand to Omsk *viâ* Tashkent and Semipalatinsk. Colonel Federovski said that he thought ~~Tiumer~~ would probably be the point of junction of the Siberian and Turkistan railways. How thankful all the Russian Central Asian officials &c. will be for a railway from Samarcand to Tashkent! That 120 miles stretch from the banks of the Zarafshan to the banks of the Syr Darya is a weary journey in a tarantass.*

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* A tarantass is a wooden vehicle measuring about 6 by 4½ feet, with a hood and without seats. It may or may not have springs. Straw, grass, mattresses, rugs, pillows, &c. are laid down, and on these two persons can lie stretched out. There are three horses and the driver is on the box in front. See Burnaby's ride to Khiva. My first journey in a tarantass was in June 1881 from Teheran to Kazvin, 100 miles in 12 hours—good going.

The post road from Teheran to Tabriz is (or was) in much better order than that from Tashkent to Samarcand, and yet every Russian lady that goes to Tashkent has to do it. Indeed after all it is a mere cipher in comparison with the journeys that are done in Siberia. Among our fellow-travellers from Uzunada to Samarcand were three Russian ladies (a mother and two daughters) going to see the Exhibition at Tashkent, where they were to be the guests of Baron Vrevsky, the Governor-General of Turkistan. They had tarantasses ready to meet them on their arrival at the railway station at Samarcand, and went on at once to Tashkent. On our return from Tashkent we met at or near Jizak an Austrian lady bound for the Tashkent Exhibition. She spoke English rather well, and we conversed while the horses were being changed. We afterwards heard that she intended to go on from Tashkent by tarantass to Vernöe and Kuldja, and thence on horse or camel back to Pekin. I believe, however, the Russian authorities did not approve of this plan of hers, and that it was in consequence not carried out.

Although an Exhibition is essentially a civil concern, it has nevertheless a most important bearing on military considerations. It is a display of the resources of a country, and on those resources armies are dependent. I have already communicated to the Royal Geographical Society a sketch of this Exhibition. It was a proof of the thought, care, and energy that the Russian administration has devoted to the development of Turkistan. Cotton, silk, and wine, were the most prominent, as specimens of recent industrial progress. There is a brewery (Ivanoff's) at Tashkent, and doubtless several vodka distilleries. The mineral, agricultural, historical, literary, piscatorial, and military sections were all good and interesting of their kind. Native products and manufactures were there in abundance.

There is one thing that must strike every visitor to Trans-Caspia and Turkistan, and that is the vast number of horses and ponies. Every man, even the humblest, has a pony of some kind. Even the very labourers who were repairing the roads in honour of M. Vyshnygradsky, the Finance Minister of Russia, had come to their work on horseback. There were their animals picketed hard by and grazing, while the men filled in holes and ruts, and laid the dust with water. With this wealth of horseflesh there should be no difficulty about transport. Camels there are, both pack and draught, in numbers besides. The Turkistan cart seemed to me a simple and serviceable machine. It has a hood, is drawn by one horse working between shafts with a postilion driver, and can carry 800 lbs. or so over rough roads. The wheels are about 6½ feet in diameter, the tires being made of one or at most two boughs or saplings, which have been shaped, bent, and seasoned into the required circular form. The exact process of bending and seasoning the saplings I could not ascertain, but I saw the work going on everywhere as I drove about Tashkent, and also in the Exhibition, where were two specimen carts. I take it that wheels thus made are very tough—anyhow not brittle. That they stand work all right on the so-called Central

Asian roads is evident. I should like to see these carts tested against our Indian transport carts. They have the advantage of being very easily repaired.

I have just been reading in the Journal of the United Service Institution of India (No 85) a paper by H. A. S. on the very vexed question of followers. His statements as to the way in which Russian regiments are frittered away on non-combatant duties is borne out, may be, by what I noticed in Samarcand and Tashkent. While there I saw from 8 to 10 infantry regiments marching in or out of the cantonments, going to or returning from camps of exercise. I noted that in most cases the strength of the companies was from 50 to 75 men only. The peace strength of a company of a Turkistan Rifle Battalion is 200, and of a Frontier Battalion 170, combatants. I was not able to ascertain for certain why the battalions proceeding to and from camps to exercise were thus attenuated. The fact remains that they were so; and yet it is usual for battalions to muster as strong as possible on such occasions. At Tashkent we were invited to be honorary members of the Military Club, in which a ball was about to be given in honour of M. Vyshnygradsky and the visitors to the Exhibition. All the preparations, carpentering and decorations in the club and gardens were being done, I noticed, by Russian soldiers. It struck me at the time how useful it was to have soldiers trained to all this sort of work. However, there are two ways of looking at it, and certainly if, as H. A. S. says, this employment of Russian soldiers on non-combatant duties takes away ⅗rds. of the men from duty, it is an evil far exceeding that of our army of followers. These Russian battalions were hampered with very little baggage and transport. Six carts of the type already described carried the kits of about 250 men and of the officers too apparently. The weight in each cart may be estimated at from 800 to 1,000 lbs. There were no tents and no commissariat supplies. The camp was probably a standing one with the commissariat on the spot. We noted that on an early morning march the cooking-pots and materials were sent on ahead in a single cart, and breakfast prepared for the men on the roadside at a suitable halting-place. The battalion halted, piled arms, breakfasted, and then went on again. *Apropos* of the mobility of Cossacks, M. Lessar told me that the Cossacks (Ural) of his escort at Bokhara could carry all that was requisite for themselves and their horses for 12 days. What one Cossack can do, others can also do. The hot weather dress of the Turkistan Cossack is a grey frock made of camel's hair, the equivalent of our khaki. One year's service in Turkistan (and presumably also in Trans-Caspia) counts as two for officers. Formerly it counted as three. The pay is about ¼ more than in Russia proper. The horses did not look much.

I saw a few of the Turcoman levies at Merv and Bairam Ali. They did not impress me in any way. There are three sotnias or squadrons of them. They are a sort of inferior Cossack. Some dummy figures at the Tashkent Exhibition represented the local Turkistan militia of which there are, Major Wolfe Murray says, 12 detachments, aggregating about 2,500 men. Poorer specimens of mankind than these dummies I never saw. If the original is like the dummy, then the Turkistan local militia may be classed with the Bokharan troops, who are, I think, as poor as they can be. There can be no comparison for a moment between our native cavalry and infantry and the Russian Central Asian and Caucasian militia or levies. I do not mean to argue from this, that the Central Asian hordes which Russo-phobes delight to hold up as a menace to India do not exist and may not give us trouble. I merely point out that they are not formidable foes.

The head-quarters of the Turkistan Military District are at Tashkent, and of the Trans-Caspian at Askabad. The Governor-General and Commander-in-Chief of the former is General Baron Vrevsky, and of the latter General Kuropatkin. General Grodekoff, whose "Ride to Herat" is known in Mr. Marvin's translation, commands the troops in Tashkent itself, and General Bibikoff the Samarcand Division. Of Vrevsky I heard nothing, but Kuropatkin has the reputation of not letting the grass grow under his feet. I think that the Russian barracks at Baku, Amu Darya, Merv, Samarcand, and Tashkent, as far as I saw them, are good enough for their purpose, and the very healthy appearance of the men proved them to be well-fed, well-lodged and well-clothed. I certainly think that the low rooms at Amu Darya and Merv must be trying in the great heat of the Trans-Caspian summer. The barracks I saw are about as good as those in Karachi now occupied by the Baluch regiment and originally tenanted by a British regiment. One must remember of course that the Central Asian barracks have to be suited to excessive cold in winter and great heat in summer. The summer barracks of Samarcand and Tashkent were, I thought, excellent institutions; no doors or windows and unlimited ventilation. I think they would be rather nasty in a dust storm; we may, however, presume that the Russians did not build them for their troops until they had ascertained that they suited the climate.

The only place where I really saw and tasted the food of the Russian soldier was at Amu Darya. It was most excellent soup of meat, potatoes, cabbage, onions, butter, &c. &c. I wish the Indian "bobarchi" never made worse soup. Each company manages its own catering and cooking, a system that (General Annenkoff told us) had been in force since the days of Peter the Great. Black bread of course is universally eaten by the troops, and indeed at times too by the upper classes.

To look at, the Russian soldier is not particularly well clothed—that is to say he is not smart. Even the Guards at Krasno Selo are not smart. The best proof, however, that the Central Asian troops are sufficiently and properly clad is their healthiness. If they are not healthy, their looks belie them.

The infantry equipment struck me as cumbrous though servicable. However, Major Wolfe-Murray's Handbook gives all details about this, except that he says nothing of the cowhide knapsack, which I certainly saw many of the infantry wearing.

I did not think much of the horses, cavalry or artillery; some officers were well mounted. I saw three very good Turcoman horses at

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the Tashkent Exhibition and two at Amu Darya. General Annenkoff had imported an English thoroughbred stallion, and was about to commence breeding operations with Turcoman mares.

I think there is little doubt that the discipline of Russian troops is good. They are not troublesome men. The first time I met them was at Baku in June 1881, when I saw a big batch of time-expired men and invalids back from the siege and capture of Geok Tepe. The Russian soldier has always impressed me as a cheery good-hearted fellow. One little incident occurred to Sir James Hills-Johnes and myself last September at Tashkent, which is indicative of the good spirit of these men. Driving on the Orenburg road, we met a battalion of Turkistan infantry. Our driver trying to clear the road drove us into a ditch and there we stuck. Several men of the battalion without orders and quite of their own accord, seeing our fix, fell out, pulled the vehicle out of the ditch, and then without waiting for thanks ran off laughing and jumping, like a lot of school boys, to resume their place in the ranks. It showed a good kindly spirit.

The Military Club at Tashkent is an excellent institution. The building was a fine large one, with a very fine ball-room and a nicely laid out garden. The cuisine was plain, but very good, and the prices were very moderate. In this respect many of our station and regimental messes in India may take a lesson from this club. The Russian officer with his small pay is messed far better and more cheaply in Central Asia than the British officer, with three times the pay, is in India. In India we seem to have succeeded in producing a crowd of the most villainous cooks and most unmannerly servants that so-called civilisation ever tolerated. But then we do not decorate our cooks. The Russians do. General Annenkoff's cook had two decorations on his breast.

I should say that at Tashkent and Samarcand the question of transport and supplies for the troops presents no difficulties. But as far as India is concerned, the crucial test is in what time and in what quantity can transport and supplies be collected by the Russians within striking distance of the Afghan frontier, *i. e.* (say) at Karshi, Kilif, Karki, Merv, Panjdeh, Dushakh, &c. I have come to the conclusion myself, that if a large Russian force, say 30,000 men, had to be moved from Tejend and Merv towards Herat, the difficulties of collecting sufficient transport and supplies would be great, and the delay considerable. It is a march of from 15 to 20 days from Tejend and Merv to Herat through an unpopulated and unproductive country, in which water too is scarce. If it be true that a branch line is being made from Dushakh to Sarakhs, to be continued later on Ak Robát or Chihil-Dukhtarán, then circumstances will be altered. What can be done in the way of transport and supplies along the right bank of the Oxus towards Karki, Kilif, and the Chushka Guzar ferry, I have no idea of, not having been there.

There are excellent schools both for boys and girls at Tashkent. In fact the Russian administration does not appear to neglect the education of the children of its employés. The Russian population of Tashkent is very large—much larger than at most of our Indian cities and cantonments. We have in India very fine universities and schools for natives of all ages, but not for European children. Here the Russians differ from us. We send our children home to be educated. They educate theirs in Tashkent and elsewhere. We found 74 children attending Annenkoff's school at Amu Darya. The Russian is obviously more at home in Central Asia than we are in India. Of course the climate of Tashkent is more suited to a European than that of any place in India—even I believe than the hill-stations. Besides the Russian has nearer blood-ties to the Asiatic than we Anglo-Saxons have.

One of the pleasantest episodes of our Central Asian trip was a visit to M. Lessar at Bokhara. We shall not of course lightly forget the dusty, jolty drive of eight miles from the railway station to the residency, nor the dirt and squalor of the city and its inhabitants. We were lodged in quite oriental style—no chairs, only a brass basin to tub in, and very little water, &c. &c. Still we did uncommonly well, and should be thankful that we had not to locate ourselves in a "serai." The names of Stoddart and Conolly are inseparably associated with Bokhara. Whether their horrible prison was inside or outside the citadel will probably never be definitely settled. On my return to London at the end of last year (1890) I met a nephew of Captain Arthur Conolly, Major Conolly late of the 7th Fusiliers, whom I had first met at Kandahar in 1880. He told me a curious ancedote. Arthur Conolly was murdered in 1842. It was some 20 or 30 years later that his sister found herself sitting at dinner in London next to an attaché or secretary of the Russian embassy. That gentleman told her in course of conversation that he recollected seeing in St. Petersburg a small book, which was said to have been in Conolly's possession when he was imprisoned in Bokhara, and the margins of which had been used as a diary by him. Naturally his sister expressed great anxiety to see this book. About a year later with the assistance of her informant, the book came into her possession.

Bokhara itself I found utterly devoid of attractions. It is filthy and has no handsome buildings. The people are a repulsive-looking lot, be they Uzbeg, Sart, Tajik, or Jew. The troops are contemptible, and the climate and water abominable. Flies and stenches abound. It was pleasant to meet and talk to men like Annenkoff, Lessar, and Klem. I experienced no other pleasure in Bokhara. Even the bazars contained nothing, the possession of which one might covet.

From Bokhara we passed on to Amu Darya and paid Annenkoff there a brief but pleasant and instructive visit. He shewed his schools, troops, barracks, workshops, curios, &c. to us. His red and white wines and cognac from his factory at Karakul were good and sound. Among others things he shewed me was a set of British mounted infantry officer's saddlery presented to him in 1888 by Majors Yate and Peacocke.

The attraction to me of a journey to Tashkent was the opportunity it afforded of seeing the existing state of the Russian provinces of Turkistan and Trans-Caspia. The ruins of old Merv, and the architectural relics of Samarcand, had for me quite a secondary interest. The modern cantonment of Merv and the imperial domain at Bairam Ali appeared to me of more interest and moment than any relics of Alexander the Great, or the Seljuki dynasty. In fact we three fellow travellers had, not unnaturally, somewhat divergent views as to the value and interest of different objects and scenes. Before we left Bokhara we had a rather animated discussion as to what places we should stop and see between Bokhara and Uzunada. Amu Darya we were certainly to stop at by General Annenkoff's special invitation. Beyond that, one was in favour of the "old mud walls" of ancient Merv, and the other had a *penchant* for the new mud huts of modern Merv. We finally split the difference and stopped at both. At daybreak on the 4th of October we found (again thanks to Annenkoff) four horses ready waiting for us at Bairam Ali railway station. The stationmaster acted as cicerone. We spent 4 hours among these ruins, and they were not misspent. The tomb of Sultan Sanjar Seljuki is, in its size and solidity, more striking than that of Taimur Lang at Samarcand. But while the tombstones of the latter are in a perfect state of preservation, those of the former have absolutely disappeared. Sanjar, however, died in 1128 A. D. and Taimur in 1405. The most remarkable remains of old Merv is a huge circular rampart, say a mile in diameter, 150 feet high, 150 feet thick at base, and 30 feet thick at top. In the centre of this circle is a citadel of proportionate dimensions. One could but feel a respect for a people and age, that produced this gigantic structure, gigantic even in its ruin, which is assuredly, pre-Islamite if not prior to the Christian era. It is known now as Giaour Kala, a Muhammadan epithet that tells us nothing. After visiting these ruins which, however interesting, will never again affect the world's destinies, it was more interesting, if more prosaic, to note the progress that the Russians have made towards rendering the place habitable. Everything at Bairam Ali depends on the Sultan Band irrigation works. Very shortly after I returned to Europe further interest was attracted by the news that the Band-i-Sultan had burst, and that an officer of our Royal Engineers, Sir Colin Scott Moncrieff, had been invited, and was going to Merv, to give the Russian engineers the benefit of his advice. I was so fortunate as to meet Sir Colin Scott Moncrieff at Cairo last February, and to hear from him in person an account of the Band-i-Sultan irrigation works. There is no reason to doubt that in time they will be successfully completed, and the imperial domain be brought under cultivation. When we were there, large well-built stone houses for the employés, &c. were completed or approaching completion, and an area of about 1½ square miles was under cultivation as a nursery. Certain trees (especially the acacia and poplar) and plants grow with marvellous rapidity there, as they do in Sind and Baluchistan. We found there, just arrived from Kuldja, about 100 families of Dungans or Tunganis, the Muhammadan Chinese of Kuldja. I understand that these Tunganis are those who rebelled against China some 26 years ago (in 1864) in eastern Turkistan, and for the time were successful in shaking off the Chinese yoke. In 1876-8, however, the Chinese re-established their supremacy, and when in 1880 Kuldja was handed back to China, I fancy these Muhammadan rebels moved into Russian territory. The authorities in Siberia and Turkistan at last hit on the idea of utilising the Tunganis as colonists in Central Asia. Hence our finding them at Bairam Ali last October, They had only just arrived there and had not had time to settle down. I have always considered that the Tunganis of Kuldja, and the Panthays of Yunnan and the Shan states have a more or less similar history, all three being Muhammadans, once rebels against and now refugees from Chinese rule.

Bairam Ali (old Merv) and modern Merv are only 18 miles apart. The latter is in itself in no way a striking place. Its interest lies as much in its name as in any real intrinsic value. At present it monopolises most of the water of the Murghab for purposes of irrigation. When the Sultan Band is finished the Imperial domain at Bairam Ali will exact its share. The Czar, however, has decided that the irrigation of his domain is not to involve any loss of water to the Turcoman cultivation round Merv. Modern Merv consists of a club, the houses of Russian officials, several barracks, and a very unpretentious bazar tenanted by Armenians, Persians, Caucasians, Turcomans &c. A canal some 40 feet broad, and deep, runs through it in a northerly direction, carrying all that is left of the waters of the Murghab river. The railway bridge crosses this canal and is the only bridge in the place. All the cart, horse, camel, and human traffic, have to cross by this one bridge, which is in every way ill-adapted for such traffic. There is no doubt, I think, that the name of Merv was never really applied to this place by natives. To them it was known as Kala-i-Kaushid Khan. Europeans revived the old name of Merv and made a present of it to the Tekke Turcoman settlement that sprang up round Kaushid Khan's Fort. The Fort itself rather puzzled me. Its south side never seems to have existed, and the remaining sides are so indented and worn away as to be practically without trace. They say the Turcomans thought of completing these fortifications after the fall of Geok Tepe in 1881. So completed they would have formed a much stronger position than that afforded by the weak and low ramparts of Geok Tepe, which gave no adequate protection to its Turcoman defenders. When I saw Geok Tepe I could not but feel surprise that it detained the Russians for close on 30 days—9,000 Russians under Skobeleff. However, it is not safe to criticise operations without being present at them. Skobeleff's reputation for "forwardness" should be almost a certain guarantee that there was some good ground for this seemingly needless delay. Having looked at Geok (or rather Denghil) Tepe and its tumble-down walls, there is little more to be said or seen about the place. It is deserted now.

The best thing about modern Merv is the bi-weekly fair. The Turcomans crowd into Kaushid Khan's Fort, where the fair is held, in thousands, most on horses and some on donkeys. As at Tashkent and Samarcand, so around Merv, the man who cannot support a horse is in a rather parlous state. The one thing to buy at the Merv fair are the carpets. Annenkoff and others shewed us some very fine new carpets. The furnished Turcoman and Kirghiz kibitkas at the Tashkent Exhibition were a sight worth seeing.

The Trans-Caspian railway passes within a few miles of the northern scarp of the curious natural fortress of Kalat-i-Nadiri, in which I spent three very pleasant days in July 1885 as the guest of the Governor. I do not think Kalat-i-Nadiri is of any stategical value; still it is just as well that it should remain in the hands of Persians, who set much store by it, but take not the slightest pains to make it really as impregnable as they boast, (and some believe) that it is. The chief village in it is Gugumaz, whence to the top of the northern scarp overlooking Dushakh, Kahka, and the Akhal Tekke country, is a ride of six or seven miles, passing *en route* the remains of Nadir Shah's residence. I tried hard from the train to make out Kalat-i-Nadiri, but from that side it is not recognisable.

On our return journey we made no halt anywhere between Merv and Uzunada. Time did not admit of it—otherwise there is plenty to see. Had I had my choice, I would have ridden from Askabad to Kuchan by the new Russo-Persian carriage road, of which I bought a number of photographs at Samarcand. However, I do not think General Kuropatkin would have consented to this, and after the kind reception we had had on all sides, it would not have been courteous to take "French leave." By-the-bye just now the Russians will give the French permission to do anything in Central Asia. The curious thing is that the French do not take much advantage of it. At Samarcand we met two members of the de Montebello family. The Parisian photographer at the Exhibition at Tashkent we found hobnobbing in the friendliest way with Russian princes and generals—a fact that perhaps atoned to him for his temporary exile from "la belle France."

On the 9th of October we found ourselves back at Tiflis, where we separated, I bound for Constantinople, Pesth, Vienna, Berlin, and Paris, to London, and my companions to the same terminus *viâ* Vladikavkas, Moscow, St. Petersburg, &c. At Constantinople I met Professor Arminus Vambéry, and we had ample food for conversation as we travelled together to Pesth in the Orient express. No brigands, I am glad to say, troubled us (N. B The Orient express does not ply in Italy, as has been statad by a well-known Indian journal). The Russians still delight in asserting that Vambéry's journey to Bokhara in 1864 is a myth. It is not, I believe, generally known that Professor Vambéry was within an ace of visiting India during the past cold weather. Speaking Persian, Arabic, and Turki as fluently as he does, he would certainly have been welcomed by the Muhammadans of India. A man who had visited Khiva, Bokhara-i-sharif, Samarcand, and Herat as a dervish, being intimately acquainted with the manners and customs of Muhammadans, and who had interviewed Saiad Muhammad Khan at Khiva, Muzaffar-ud-din at Bokhara, and Yakub Khan at Herat, could not but be an object of the greatest interest to all Muhammadans. When political feeling is quieter, India will no doubt see Professor Vambéry.

Given the permission of the Russian Government, we should find Messrs. Cook and Gaze establishing branch offices at Samarcand, and issuing tickets by tarantass and caravan across the Pamir, the Thian Shan mountains, and the Gobi desert, and circular notes on the principal towns along the great Central Asian trade route *viâ* Kashgar to Pekin, described by Col. Mark Bell, V. C., A. D. C., in the February No. (1890) of the Proceedings of the Royal Geographical Society.

Since 1886 the strength of the Black Sea navy has been considerably increased, the port of Novorossisk has been connected with the Russian railway system, and Batum has been very strongly fortified. Sebastopol is soon to be a purely naval and military post, the fortifications of Kertch secure that port and the ports of the Sea of Azof from attack, there are railways to most of the principal Russian ports from Odessa on the west to Rostoff on the east, and the number of Russian steamers trading from Black Sea ports, available as transports in time of war, is large. The Russian Steam Navigation Company's fleet numbers 96, mostly, however, small. The Russian Government thus has at its disposal the means of landing large bodies of troops at any point of the Black Sea that it chooses, always provided that a hostile fleet does not interfere with it. For concentrating troops in the Caucasus it has at present three available routes, (1) *viâ* Poti and Batum to Tiflis (2) *viâ* Novocherkask and Novorossisk to Vladikavkas, and thence by the military road to Tiflis; and (3) from Astrakhan to Baku (or any other Caspian port), and so to Tiflis. I was informed by a Colonel of the Russian Engineers (an Englishman by parentage and in appearance), that the railway route from Vladikavkas to Tiflis had been surveyed and its construction decided on. A line from Vladikavkas to Petrovsk has been projected for five or six years at least, and I asked him about it. He said the difficulty was that the line must be carried by bridges and viaducts across at least 20 large torrent-channels, the beds of which were constantly changing—the same difficulty that attends the permanent bridging of the Oxus at Amu Darya. About a hundred miles east of Tiflis the traveller realizes that he has passed from a temperate into an arid clime. Vegetation grows scantier, and strings of camels are seen defiling across the plains. The nearer to Baku, the more bare and grim the landscape. Than Baku at first sight, no less likely spot to be a mine of wealth can be conceived. And yet it has coined millions, and it has done more to establish the Russian rule in Central Asia than all the Kaufmanns, Tchernaieffs, Skobeleffs, Annenkoffs, Komaroffs, and Alikhanoffs put together. Had the Russians been pagans, they would ere this have dedicated a temple to "Naphtha Victrix." I consider that it is not the Russian arms, but the oil of Baku, that has conquered Trans-Caspia, and will perhaps conquer a good deal more.

THE SUPPLY OF HALF-MOUNTING EQUIPMENT TO THE NATIVE INFANTRY OF THE BENGAL ARMY,

BY MAJOR C. HOGGE, 33rd Punjab Infantry.

I have ventured to write a short article on this uninteresting but still important subject, which is one of the greatest difficulties that commanding officers of native infantry regiments have to contend against in the present day, as the supply thereof not only affects the efficiency of their regiments, but also the welfare and contentment of the men.

The term "half-mounting" is applied to all articles of equipment and clothing not supplied by the State, which allows each soldier biennially a cloth tunic and a pair of serge pyjamahs, which are drawn and issued in alternate years.

This does not seem a very liberal supply, but now that khaki, provided at the soldier's expense, is so generally worn on all duties and parades, this issue is found to be quite sufficient to enable the soldier to turn out smart and clean when required to appear in such dress.

Commanding officers are responsible for the supply and issue of all articles of half-mounting equipment to their men, and endeavour to turn out their regiments as efficient as possible with the means at their disposal; and what are these means? The Government of India allows a recruit on enlistment thirty rupees kit allowance, which is supposed to cover the cost of his outfit, and after he has served for eighteen months, he becomes entitled to an allowance of five rupees per annum, drawn quarterly, for the purpose of keeping his kit in good order, and supplying from time to time any article that may require renewing.

Every recruit on first joining is supplied with a khaki suit of uniform made of some cheap material, a khaki pugree, a pair of shoes, and a rezai,[*] the cost of which is debited against his kit allowance. He is also required to be in possession of two suits of native clothing, which he has to provide at his own expense.

At the expiration of his eight or nine months training, he will have completely worn out his recruit's suit and at least two pairs of shoes.

The recruit is now ready to be passed into the ranks, and will have to be provided with the articles of half-mounting equipment which are

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[*] Khaki suit and pugree..........	Rs.	4	9	0
Two pairs shoes................	„	2	4	0
Rezai...	„	3	0	0
	Rupees	9	13	0

laid down by regulations, and which are supposed to be in the possession of every man in the Bengal Infantry, *viz.*—

Two suits of khaki at 4-6	9	12
One pair of boots at 4-12	4	12
One pair of shoes at 1-2	1	2
One great coat at 14/	14	0
One water tin and cover at 1-4	1	4
One havresack at 1-5	1	5
One durrie at 2/	2	0
One blanket at 2-4	2	4
One khaki pugree at 1-12	1	12
One lungi of regimental pattern at 2-2 ...	2	2
One pair of putties at 14 annas	0	14
One kit-bag at 1/	1	0
Rupees	42	3

I have entered against each article its average cost, which has been calculated from the prices charged by half-a-dozen different regiments.

Now if to the cost of these articles amounting to Rs. 42-3, be added the cost of the clothing issued to the recruit on enlistment, *viz.* Rs. 9-13, it will be observed, that not only has the original kit allowance of Rs. 30 been swallowed up, but that the soldier starts on his career with a debt of Rs. 22 attached to him, which both he and his commanding officer will find most difficult to clear off.

On the other hand it may be said, that some of the half-mounting equipment issued to recruits need not necessarily be new, but may be part worn equipment returned into store from the effects of discharged and deceased men, and consequently issued at reduced prices. In a few cases this may be so, but as a rule, if a soldier has served three or four years and has been knocked about during that period, there will not be much in his kit worth returning into store, and therefore the recruits do not benefit to any great extent by this means.

It may be thought that these prices are excessive, and there is no doubt before khaki became so general a dress in the army, and the movement of troops was confined to ordinary reliefs, the half-mounting equipment of the Bengal army did not cost so much as it does in the present day. Great coats were purchased locally made of some material which acted like a sponge in absorbing moisture, and were heavy and cumbersome to carry. Boots and shoes were obtained from the local *mochi*, and not being called upon to bear any great strain, answered their purpose fairly well. But now-a-days, when troops are constantly moved about to camps of exercise, and more frequently employed on expeditions, it is found by experience that nothing is so suitable as the best material; consequently great coats are brought from the great Woollen Mills, boots from the Government Factory at Cawnpore, and any commanding officer, who is desirous that his men should turn out smart and hold their own when brigaded with other troops, is obliged to fall back on fast-dyed khaki.

All these things cost money, the expense of providing and renewing the same falling upon the soldier, who is subjected to deductions from his already scanty pay, or has to pay for the same in hard cash, the annual Government grant of Rs. 5 being hardly sufficient to keep him in shoe leather.

Of course these deductions must cause a certain amount of discontent, although very rarely heard, but still when the soldier returns to his village on leave or furlough, and discusses the matter with his friends, these constant deductions from his pay on account of uniform worn in our service cannot but be detrimental to recruiting.

I have already shown that a recruit starts on his career burdened with a debt of Rs. 22, and the question is how is this to be cleared off?

It is laid down in regulations, that no man is to have more than Rs. 5 deducted from his pay in any one year on account of half-mounting, and as the recruit draws none of the annual Government grant until he has completed eighteen months service, it will take nearly three or four years at this rate before he is clear of debt. In the mean time his boots and shoes are wearing out, one suit of khaki will have to be renewed, and commanding officers are at their wits end how to provide cash for all these accumulating debts without further encroaching upon the soldier's pay. It is indeed a difficult question to answer.

A great deal has been done of late to improve the condition of the native soldier, but a great deal more remains to be done, if we wish to attract men to our standard, and keep them cheerful and contented. The soldier is now called upon to do more work, which of course means more wear and tear to his clothing and extra expense to himself, and unless the State steps in and helps to meet the extra expenditure, this very important question of "how to meet the ever increasing debit" will still remain unsolved. Colonel King-Harman, in his essay on recruiting, advocates that every man should be furnished with a free kit, and that everything that he is required to wear in the performance of his duties should be given him free.

This if carried out would at once solve all difficulties, and I firmly believe would be the best plan in the end; but if the State is not prepared to go so far, then I would venture to suggest:—

1st.—The kit allowance should be raised to Rs. 50, so as to start the recruit on his career free of debt.

2nd.—The annual grant in aid of half-mounting should be given to each recruit from date of enlistment.

3rd.—That a free issue of a pair of boots, or, in those regiments which do not wear boots, two pairs of shoes, should be made to each soldier annually, commanding officers being held responsible that such an issue is actually required for their regiments for the year in question, no compensation being allowed in lieu thereof, and in the case of such issue not being required, to lapse to the State.

4th.—The annual grant in aid of half-mounting should be raised from five rupees to eight rupees per man.

If these proposals, which would not cost on an average more than twelve rupees a soldier per annum, were sanctioned, it would enable commanding officers to keep up the half-mounting equipment of their regiments in an efficient condition, without making any deductions from the pay of their men, and thus add considerably to their contentment, by removing the only cause for discontent and hindrance to recruiting which at present exist.

There is still another subject connected with the half-mounting equipment of our native infantry regiments, which in these days of linked battalions seems most important, and that is, the want of uniformity in the patterns and materials of the different articles of half-mounting, which at present exists in the regiments of the Bengal army.

I have been lately serving with two of the newly raised corps, and have had an opportunity of so judging from the kits of the transfers from at least twenty-five different regiments, and I think, I may safely say, that amongst these there were not two regiments which had their half-mounting equipment of the same pattern.

"Khaki blouses" of all colours and shapes, generally cut to some regimental .pattern.

"Water-tins" of every shape, size, and material, copper, wood, and zinc.

"Havresacks" of all sizes and patterns.

"Durries" and "blankets" of all sizes and weights, which only becomes of importance when taken on service.

"Kit-bags" of various shapes and materials.

Some regiments wearing gaiters and shoes, others brown or black boots with putties; great coats, as a rule, are of the same pattern and material.

No doubt these articles are all serviceable in their way, but lack a want of uniformity, which in these days of liability to transfer from one linked battalion to another seems to require that all articles of half-mounting equipment should be of the same pattern, and also of the same cost, so that the soldier on transfer should be put to no extra expense by being called upon to provide himself with articles of regimental pattern appertaining to his new corps.

It is laid down in General Orders, what half-mounting equipment should be taken by a regiment on active service, but owing to this want of uniformity in the size and weight of the different articles, it will most probably be found, that the regiments are not equipped exactly alike, some giving their men a jersey or cardigan jacket, others taking an extra blanket or pair of boots, all endeavouring to make the man's kit as effective as possible with the weight allowed. I would therefore venture to suggest, that a committee composed of officers from native infantry regiments should be assembled at Army Head-Quarters, and go carefully into this important subject, *viz.*, the supply of half-mounting equipment to the native soldier.

They should decide upon the material, pattern, and cost of each article of half-mounting equipment, and settle upon the weights and dimensions of blankets, durries, &c. Sealed patterns of each article should then be furnished to regiments, and commanding officers held responsible that no deviation is permitted.

By this means, some uniformity, both as regards the pattern and price of the different articles of half-mounting equipment, would be introduced into the infantry regiments of the Bengal army, which at present does not exist, much to the detriment of the soldier, should he be transferred to another corps.

In conclusion, although the half-mounting question does not seem to have much interest in itself, so much lies behind it that is worthy of deep consideration, and I therefore venture to hope, that this article may do somewhat to call attention to the ever increasing difficulties that commanding officers will find harder and harder to contend against, unless the State steps in to their assistance, and gives them some additional aid towards the supply of half-mounting equipment to the native infantry of the Bengal army.

CAVALRY RECONNAISSANCE,

as influenced by modern improvements in the armament of infantry, and by the introduction of smokeless powder, with a suggested scheme for the rapid transport of supporting infantry.

Translated from "*L' Italia Militare e Marina,*" Nos. 96 and 97 of 1891.

By Captain A. **Montanaro**, 16th Lucknow Regt. B. I.

There has been of late a strong and widely circulated opinion, especially in France, that since the introduction of the present perfected rifles and of smokeless powder, whatever may be the nature of the ground, and the respective positions of contending forces in the field, the future *rôle* of cavalry in reconnaissance has become extremely difficult, so difficult that according to the best authorities on tactical questions, it cannot be efficiently carried out without the constant co-operation of infantry.

It may be contended that cavalry must now, as formerly, be satisfied with discovering only the *movements* of the enemy, not his tactical dispositions. True; but formerly the smoke used to define with sufficient clearness, not only the position of the enemy, but also to a certain extent his approximate strength. In future it will be necessary to ride up to quite close quarters, in order to see men, horses, and guns, for there will be no smoke to define their position—a much more difficult task. Some might conclude that therefore cavalry has lost much of its former value; but we are far from sharing this opinion. Because the *rôle* of cavalry in action has become more difficult, it does not follow that its presence is the less necessary. Increased difficulties should, on the contrary, impel us to study the best means of attaining the desired end, and increasing the value of those results, which notwithstanding all difficulties, the cavalry of the future will still be able to obtain. Whatever may be argued, neither reconnaissance at a distance—that is special reconnaissance in force, nor ordinary reconnoitring and scouting can be efficiently carried out by infantry alone. An army without cavalry would have to restrict its operations within a radius of a few miles, and even then would have to expose the troops composing it to the greatest fatigue and privation. It would inevitably be obliged to act only on the defensive, or be reduced to inaction, owing to the mystery shrouding the movements of the enemy. We repeat that cavalry is not only still useful, but indispensable.

On the other hand, it is undeniable that a small group of infantry, or even militia, armed with the new rifles and holding a defile or entrenched in a village, or even merely extended along a bit of rising ground or a row of trees, will be able to check the advance of large bodies of unsupported cavalry. But then horse artillery—it will be argued— should be able to dislodge the enemy's infantry. There is no doubt that the action of horse artillery has much increased in importance; but will its fire be sufficient to oblige the enemy's infantry to retire? It is extremely doubtful. Artillery can *shake* the defence;—can efficiently prepare the attack of its own infantry; but it is only in exceptional cases that it will succeed in dislodging a brave and persistent defender from his position. Therefore unsupported cavalry will be obliged either to charge, or to have recourse to a dismounted attack. The first is little likely to succeed, because the defender, who whilst under artillery fire could keep more or less under cover, will reinforce his firing line, and receive cavalry with a storm of bullets. Let us see how a dismounted attack would answer.

As is well known, all our cavalry is armed with a good carbine and is well drilled in dismounted duties, they are therefore capable of fire-action, and might attempt such attack. But we must not be sanguine of success. It is already doubtful whether a cavalryman, when separated from his *raison d' être*, the horse, can preserve that *dash*, that high *morale* for which he should always be distinguished; but besides, we have no doubt that one cannot really expect 200 dismounted troopers to be equal to a company of good infantry. It is a question of habit and surroundings, and of that very instruction imparted to the cavalry soldier and intended to develop in him all the best qualities of a *horseman*. But there is yet another consideration:—One of our divisions of 24 squadrons* could not dismount, at the outside, more than 2,000 men, that is to say, two battalions; but we may be certain that they would never venture to dismount so many, as in that case there would hardly be more than one troop left mounted, and they would be obliged to leave behind them an adequate escort for that enormous mass of horses which would have to be kept steady, often under fire.

All things considered, therefore, and although the combined action of infantry with cavalry in reconnaissance has many determined opponents, we believe that the best means of obtaining the desired results (with especial reference to the new rifles and smokeless powder) consists in associating with the large bodies of cavalry employed in reconnaissance carefully picked bodies of infantry.

In all the campaigns of the latter half of this century, the necessity for such a combination has been clearly demonstrated, especially in the case of special reconnaissance in force, at a distance from the main body. We will give two examples, culled from the "*Rêvue du Cercle Militaire*," of this year, No. 21.

On the 28th June (1866) the Prussian Lieut.-Colonel Heinicher led a reconnoitring force consisting of six squadrons and a battery from Trautenau towards Gicin. The latter place was occupied by two squadrons of the Liechtenstein Hussars, one battery, and a company of the 18th Chasseurs. This single company, with its fire, kept the enemy's squadrons in check until the arrival of General Edelsheim, who forced the Prussians to retire.

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* The Italian cavalry divisions are each composed of two brigades. Each brigade of two regiments. Each regiment consists of six squadrons.—(Trans.)

On this example, Major Kunz (Uber die Thätigkeit und Verwandung der Reiterei im Kriege von 1866) observes that a single battalion of Chasseurs attached to the Prussian regiment of cavalry and carried in carts to enable it to keep up, would have sufficed to capture Gicin, and hold it against the whole of Edelsheim's division.

On the 2nd July 1866, the Bavarian division had sent out reconnoitring patrols of cavalry to Schmalkalden and Salhungen, but these had returned without having been able to obtain the slightest information of the enemy. Colonel Aldosser of the 9th Infantry then despatched from Wernshausen, at 8-30 P. M., a squadron of the 6th Light Cavalry, accompanied by one company and a half of his regiment mounted on carriages This reconnoitring party, when west of Barchfeld, discovered numerous bivouac fires, and advancing, came in contact not far from Junnelborn with the outposts of the Prussian General Goben's division. A sharp engagement ensued, which cost the Bavarians considerable loss, but enabled them to form a very clear opinion of the strength and dispositions of the enemy.

And this was in 1866, when one side was still armed with muzzle-loaders, whilst, on the other, the breechloader was scarcely out of its infancy. What are we to conclude from these lessons? We conclude as follows:—

Since it may be taken for granted that it is no longer possible for cavalry to act its part in reconnaissance without the support of infantry fire; and since, on the other hand, it is undesirable to have recourse to dismounted action except under very special circumstances; it will be necessary to adopt normally the combined action of cavalry and infantry.

For the cavalry of an army corps which precedes the columns by only a few miles, we do not think it necessary to lay down any special rules, that is to say, the matter may be left to the discretion of officers commanding army corps to judge when and under what circumstances it may be advantageous to keep the enemy's reconnoitring cavalry in check by means of one or more battalions of infantry. But as regards the advanced cavalry of one or more armies, we would prefer to see the combined action of the two arms definitely laid down.

The advanced cavalry of an army should be pushed on several days' march ahead of the columns of the several army corps. It will therefore be impossible to send infantry with them, except only when it is specially applied for. It is absolutely necessary that such infantry should form an integral portion of the divisions of cavalry. A battalion of very carefully picked infantry, say of Bersaglieri,* per division should suffice. It would comprise about the same number of rifles as could be placed on the fighting line by dismounting a whole brigade; but, tactically, there is no doubt, it would be infinitely superior. Besides, instead of losing the services of half the division (as cavalry), it would leave it intact, without fear for the safety of its batteries, and of its own flanks or rear, and free to go straight at its objective.

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* Light Infantry or Rifles (literally *Targeters*). There are 12 regiments of three battalions each. They and the Alpine Infantry (7 regiments—75 companies in all) are the *élite* of the Italian infantry.—(Trans.)

It is clear, however, that this battalion, however composed of swift walkers, would never be able to follow the squadrons in their rapid movements. Hence the necessity of *cart* transport for it;—but such carts, if only requisitioned when wanted for this purpose, would not be obtained without great difficulty and loss of time; and as this necessity may be considered as constantly recurring, such carts should be always at hand. They should be of a regulation pattern, or at least should be requisitioned at the commencement of a campaign from among those most suited to the purpose under consideration, (and which have already been registered, and their owners warned beforehand in time of peace.) They should be drawn by four good horses to be able to follow artillery and cavalry on any special rapid march they may be ordered to undertake, not, of course, in tactical movements in the field, but simply in order to be transported rapidly to the scene of operations.

Every cart could carry, say 14 men; hence 64 would suffice for each battalion. It would be well if these carts could also be made to carry a due porportion of entrenching tools to distribute to the whole battation.

We insist on the importance of this our proposal, being convinced that since combined cavalry and infantry action seems imposed upon the armies of all nations by the of exigencies modern perfected armament, it seems all the more so to us Italions. In fact, the broken and intricate nature of our country, the possibility, if not the certainty, of finding opposed to us, a cavalry enormously superior in numbers, should induce us to have in support of our squadrons a select body of infantry; either to check the masses of the enemy, or allow our cavalry to avoid their shock action, should this be likely to prove disastrous to us; or to keep the enemy's force employed, while our squadrons are massing elsewhere to fulfil the object they may have in view at the time.

"THE ANGLO-RUSSIAN QUESTION IN CENTRAL ASIA, AND THE DEFENCE OF INDIA."

(Translated from the *Revue Militaire de l' Etranger* for May 1891.)

By Captain H. B. B. Watkis, 31st Punjab Infantry.

The reported fertility of the plains of the Punjab and the Ganges has in all ages attracted those populations who, less favoured by nature, have dwelt scattered in the mountains of Afghanistan, on the lofty plateaux of Iran, or in the steppes of Central Asia. The invasions of India from the West date back thus to very ancient times. Following the Aryans of the Hindoo-Koosh, Semiramis, Sesostris, Cyrus, and Alexander have in turn all crossed the Indus, and have been followed in the same way by the Parthians of Arsaces II, and by the Scythians.

The Mongol invasions of India date from the VIIIth century, when Uguz Khan from Turkistan crossed northern Afghanistan and penetrated into Kashmir, returning to Samarcand *viâ* Gilgit and Badakshan.

Two centuries later, Mahomed of Ghazni launched twelve successive expeditions against India, and selecting for his route the Gomul Pass across the Suleiman Mountains (which leads from Ghazni to Dera Ismail Khan on the Indus), advanced as far as Delhi.

After the XIIIth century the invasions of India begin to increase in number under Chenghiz Khan, Turmenchir Khan, and Timourlane. These were all very much of the same character, and consisted of hordes of irregular horsemen, whose advance to the Indus across northern Afghanistan was always marked by frightful cruelties, the terrified inhabitants scarcely ever attempting any resistance.

In the XVIth century, Baber, a descendant of Timour, starting similarly from Turkistan, undertook a series of expeditions into India after subduing the whole of Afghanistan. In his last expedition of 1525-1526, he advanced to the Indus by the Khyber Pass, and thence on to Delhi *viâ* Jhelum, Sialkot, and Umballa.

Defeating Ibrahim, the Emperor of India, in a great battle at Panipat near Delhi, he founded the Mogal dynasty, which lasted up to the end of the eighteenth century.

The more recent invasions of India date from the XVIIIth century. Nadir, the chief of a Turcoman tribe, and subsequently Shah of Persia, crossed Afghanistan in 1738, and reaching the Indus by the Khyber, also advanced as far as Delhi after defeating the army of the Emperor of India at Panipat. For a time Persian rule extended over the whole of Afghanistan, and over all north-western India; but on the death of Nadir, this vast empire crumbled to pieces, and Afghanistan first became independent under Ahmed Shah, the first Amir of Cabul.

It was Ahmed Shah who, in 1761, led the last great invasion of India, reaching and burning Delhi after a victory at Panipat, where the fate of India was thus decided for the fifth time since the invasion of Timour.

The first attempts on the part of the English to establish relations with Afghanistan date from 1809, in which year they despatched an embassy to Cabul, which was however not very successful.

It was in 1831 that Captain Burnes left Delhi for Cabul, and was graciously received by the Amir Dost Mahomed. He pushed on as far as Bokhara, returning to Calcutta *viâ* Peshawar. Encouraged by the success which he had met with, Lord Auckland, the Viceroy of India, sent him back to Cabul on an official mission But on his arrival at the Amir's court, Burnes found a Cossack officer, Vickovitch, there, who had come to Cabul, according to report, to open up commercial relations with Afghanistan, and had already acquired considerable influence with the Amir, and Burnes returned to India without meeting with any success.

This, and the siege of Herat which the Persians had just commenced with the assistance of some Russian officers, decided Lord Auckland upon sending an expedition into Afghanistan. On the 8th November 1838 he announced, in a proclamation, that his aim was "to establish a permanent barrier against all aggressive projects directed against the north-western frontier of India."

In the meanwhile, a demonstration in the Persian Gulf, and the brave defence of Herat by a young English officer, Eldred Pottinger, had forced the Persians to raise the siege. The Indus army, however, took the field on the 10th December 1838, and crossing the river at Sukkur, advanced by the Bolan Pass on Kandahar, which was occupied. Ghazni was next carried by assault, and the English army reached Cabul towards the end of the hot weather of 1839.

Dost Mahomed was dethroned, and was replaced by Shah Sujah, a creature of the English. But troubles soon began to arise. The tribes of the Khyber rose in the rear of the expeditionary force, and the latter, cut off from all communication with India and deficient in provisions, had shortly no other resource left but to cut its way through to the Indus; 5,000 combatants and 12,000 followers left Cabul on the 6th January 1842, of which force only one man reached Jellalabad on the 11th January, the remainder being all dead or prisoners.

The English garrisons of Kelat-i-Ghilzai, Kandahar, and Jellalabad, however, held out stubbornly, and in the following August, General Pollock re-entered Cabul, after completely defeating the Afghans.

On the conclusion of this second campaign, the English hastened to replace Dost Mahomed on the throne, and to evacuate the country.

The Crimean war again drew their attention to Afghanistan. On his re-establishment on the throne, Dost Mahomed had consolidated his rule, and had undertaken the conquest of Afghan Turkistan, a conquest which was completed twenty years later. In March 1855, the Amir and the Viceroy of India signed a treaty of pepetual alliance, which was confirmed in January 1857 by the grant of a large subsidy. In the preceding year (March 1856) Persia, acting in concert with the Afghan Governor of the Province, had occupied Herat. England, again thinking that she saw Russia at the back of Persia, declared war with the Shah. After a short campaign on the Persian Gulf, she obtained the evacuation of Herat by the treaty of Paris, dated 4th May 1857. But Herat remained none the less under the suzerainty of Persia, with an Afghan Governor—the Amir of Afghanistan only definitely obtaining possession of it in 1863.

Whilst British influence was being thus established, not without many difficulties, in Afghanistan and Persia, Russian influence on the other hand was increasing much more rapidly in Central Asia, although Russia's initial attempts had been most unfortunate.

In 1717, Prince Tcherkaski was entrusted by Peter the Great with the mission of seeking a route to India across Turkistan, but he and the whole of his force were massacred by the inhabitants of Khiva, and for more than a century no further attempt was made. It was only in 1839 that Nicholas I. entrusted the direction of operations against Khiva to General Perolski, these operations being however completely unsuccessful. Eight years later, further operations were undertaken with the assistance of a flotilla on the sea of Aral and on the Syr Darya. Slowly the Russians advanced, constructing forts in their rear along the river. Ak-Mesjit was captured in this way, and transformed into Fort Perofski, the Khan of Khokand failing in 1853 to expel the Russians.

After the Crimean war, which delayed their progress for a moment, an opportune insurrection in Khokand, and the intervention of the Amir of Bokhara, led to the intervention of the Russians, whose advance from that time became more rapid, and by 1866 Djoulek, Turkistan, Tchemkend, and Tashkent were in their hands.

The English Government had displayed a certain amount of uneasiness even before this date, but public opinion in England itself was indifferent in the matter. On the 22nd May 1865, Sir Roderick Murchison, the President of the Royal Geographical Society of London, declared that the invasion of India by the Russians was "a pure chimera, if not an absolute impossibility."

In 1866, however, General Romanofski had undertaken another campaign against the Amir of Bokhara, who was completely defeated and in 1868 Samarcand was occupied by General Kauffmann, the Amir of Bokhara shortly afterwards becoming a vassal of Russia.

Finally, after Skobelef's campaign in 1875, the Khanate of Khokand was annexed (1876), and Russian Turkistan was formed into its present four sub-divisions, *i. e.*, the districts of Ferghana, Zarafshan, Syr Darya, and Amu Darya.

Between the Caspian sea and the Paropamisus, the Russian advance was still more rapid. Krasnovodsk, the future terminus of the Trans-Caspian railway being occupied in 1869.

In 1873, in consequence of difficulties which had arisen with the Khan of Khiva, an expedition was undertaken against the latter, and several columns from the Caspian and from Russian Turkistan marched on his capital. On the conclusion of the campaign the Khan accepted the suzerainty of Russia, whose possessions now extended to the Amu Darya. To the south, however, the Tekke-Turcoman nomads were still independent, and were not subdued till after a very sanguinary struggle.

In 1879, General Lazaref starting from the Caspian was unsuccessful before Geok-Tepe, the principal stronghold of the Tekke-Turcomans, and this place was only captured by Skobelef in 1881, after a celebrated assault. Three years later, owing to Colonel Alikhanof's influence, Merv was occupied without a blow being struck. The Russian possessions now extended uninterruptedly from the Caspian to the Syr Darya.

The attention of the Indian Government had however been unceasingly directed towards Afghanistan. In 1869, a new arrangement had been made with Shere Ali, Dost Mahomed's successor at Cabul. Without going so far as to promise him British protection against interior and exterior foes, Lord Mayo, the Indian Viceroy, guaranteed him a large subsidy, and at the same time his moral support. The Amir appeared to consider these conditions as insufficient, and he did not delay in displaying a certain amount of coolness towards the Anglo-Indian Government.

The Russo-Turkish war, and the occupation of Quetta by the English in 1877, precipitated events. Quetta it is true, belonged to Baluchistan, but Shere Ali fearing that the presence of a British garrison so close to Kandahar, threatened his independence, raised protestations, which were, however, of no avail. About the same time, the report of a Russian mission having arrived at Kabul, decided the Viceroy on also sending a representative to the Amir's court, in spite of the objections which Shere Ali and Dost Mahomed had always raised. The British envoy was stopped *en route*, and was not even able to reach Cabul; and no satisfactory answer being received to her *ultimatum*, England undertook another campaign in Afghanistan.

The history of this war which opened on the 21st November 1878, is well known. Three British columns advanced respectively by the Khyber, Kurrum, and Bolan Passes, the latter column advancing in the direction of Kandahar from Quetta. On the 23rd December Shere Ali abandoned Cabul, and Kandahar and Kelat-i-Ghilzai were successively occupied by the Anglo-Indian troops. The Amir then dying, the treaty of Gandamak on the 26th May 1879 transformed his son Yakub Khan into a vassal of England.

The murder of Major Cavagnari, the British representative at Cabul on the 3rd September, occasioned a second campaign. After defeating the Afghans at Charasia, General Sir F. Roberts* entered Cabul on the 12th October; Yakub Khan was dethroned, and the English took the direct administration of the country into their own hands. But on the 11th, 12th, and 14th December the British arms met with repeated checks. Sir Frederick Roberts' communications were, for a time, cut, and to relieve him, Sir Donald Stewart had to undertake his brilliant march from Kandahar to Cabul in April and May 1880.

At this time, a new pretender, Ayub Khan, a Herati Sirdar, arrayed himself against the English. After defeating General Burrows near

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* At present Commander-in-Chief in India.

Maiwand on the 27th July, he invested Kandahar. The Indian Government who had just recognized Abdurrahman, (the present ruler of Afghanistan) as Amir, decided on undertaking a third campaign, against Ayub-Khan. Sir Frederick Roberts' great march from Cabul to Kandahar (8th to 31st August 1880), forced Ayub Khan to raise the siege of the latter place, and his complete defeat at Baba Wali on the 1st September brought the campaign to a conclusion.

The English thought proper to evacuate Afghanistan at once, and Kandahar, their furthest occupied point, was handed over to Abdurrahman in April 1881. The British Government thus relinquished once more all intention of exercising more than an indirect influence over Afghanistan, and reverted to the plan of using the country simply as a "protecting buffer" for its Indian Empire.*

Even at this time, the idea of a struggle between England and Russia was generally regarded as very improbable. In September 1880, Sir H. W. Norman wrote officially:—"The probabilities of our being drawn into a struggle for the possession of Herat, or of our fighting at Kandahar in the defence of India, are so slender, as to be scarcely worth consideration."†

These ideas were, however, modified on the annexation of Merv by Russia in 1884. Since it has not been able to cancel accomplished facts, the English Government appears to have decided on re-considering any further movement of Russia in the direction of Herat as a *casus belli*; hostilities indeed were imminent very shortly afterwards. The occupation of Pendjdeh on the Murghab by the Afghans, without any preliminary understanding with the governor of the Trans-Caspian provinces, led to the latter establishing his troops at Pul-i-Khatun, Sari Yazi, Akrobat and Zulfikar. Following which, General Komarof attacked the Afghans on the 30th March 1885, on both banks of the Kouchk near its junction with the Murghab, and completely defeated them. War between England and Russia appeared most imminent, but the nomination of an Anglo-Russian commission for the delimitation of the northern frontiers of Afghanistan, shortly afterwards dispelled all causes of immediate rupture between the two powers.

Turning to the Amir, we find the latter signing a treaty in March 1885 at Rawal Pindi, defining his obligations with the Indian Government; these obligations being confined, on his part, to a vague promise of perpetual friendship; in exchange for which the Viceroy guaranteed him an annual subsidy of about £ 120,000. Since this date the relations between England and Abdurrahman have not undergone any perceptible change. According to report, the Amir has received 379 guns and 50,000 rifles from the English; the fortification of Herat and other points have been carried out under the direction of British officers; and the Afghan army is modelled on the British, the words of command being given in English. The Amir's attitude towards the Indian Government is nevertheless a distrustful one; the latter can only be represented at Cabul by a Native; the Amir obstinately refuses to allow any extension of the Indian telegraph lines and railways into Afghanistan; and prohibitive duties are imposed on British goods.

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* Curzon's *Russia in Central Asia.*

† Quoted by Marvin in his "*Shall Russia have Pendjdeh?*," *1885.*

In Afghanistan his authority has not been established without a struggle. He has undertaken several expeditions since his accession, extending his possessions as far as the difficult country on the upper Amu Darya, where Dost Mahomed's troops had never succeeded in penetrating. But he has had to put down frequent insurrections; his health is bad, and, if he should happen to die, his death would certainly be the signal for serious disturbances. Under these conditions, it does not appear that England can place any implicit trust in an Afghan alliance.

Russia's position in Central Asia, on the other hand, has been peculiarly strengthened since 1885. A railway now connects the Caspian—that is to say, Russia in Europe,—with Samarcand, *viâ* Merv, and the Aral-Caspian base of operations, of which General Sir H. C. Rawlinson spoke, has been perceptibly shifted southwards.

Besides which, the prestige of Russia has greatly increased in these vast districts, as the English are well aware. This increase of prestige has been due to many causes, the continuous character of her operations, being the principal one. She has often been obliged to disown the acts of her at times too zealous agents, but their successors have always continued the same policy, and any territory which they have seized has been kept nevertheless. This plan of operations, so essentially different to that adopted by England in Afghanistan, is the only one which suits oriental ideas.

The different methods of procedure of the two nations after conquering a country are no less marked. Whilst the English, in their campaigns in Afghanistan, have always shewn a certain amount of indecision as regards the object to be attained; whilst they have often adopted means insufficient to the end; and whereas the conquest of the country by them has always been followed by its immediate evacuation, Russia's procedure has always been a series of rapid operations combined with the infliction of terrible blows--as, for instance, the capture of Geok-Tepe—and she has been content to wait till after the fight, to show that she is as humane and as "carelessly good-natured," as she was energetic previous to the struggle. The conquest of Central Asia by Russia has been a conquest over orientals by orientals, and the similiarity of the Russian and Asiatic characters has rendered subsequent fusion the more easy.

On the other hand, it is well known that the English have never tried to lower the barriers which separate them from the natives of India. The two races are superposed one upon the other, without any blending. It is therefore not to be wondered at, that Samarcand, in spite of its recent conquest, should be a great deal more Russian, than Benares or Peshawar are English.*

The earliest projects of a Russian invasion of India date from the end of the XVIIIth century. In 1791 M. de Saint-Génie laid a plan before Catherine II., which the Great Empress considered worthy of consideration—the project being an advance on Bokhara and Cabul from Orenburg across the steppes. A few years later, in 1800, the First Consul and Paul I contemplated combined operations with the same objectives. 35,000 French troops which were to reach the Black Sea *viâ* the Danube, were there to join a Russian army of still greater strength, and advancing *viâ* the Caspian on Astrabad active operations were to be undertaken from this point across Khorassan and Afghanistan in the direction of Meshed, Herat, and Kandahar. The death of Paul I and the treaty of Amiens prevented the execution of the plan, which was not however completely abandoned till after the rupture between Napoleon and Russia in 1812; for in 1805, a fortnight after the capitulation of Ulm, we see Talleyrand advising the Emperor to edge on the Russians in the direction of Asia, in order to prepare and to hasten the shock which must inevitably take place between England and Russia in the region of the Himalayas.[*]

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* Curzon.

Further Franco-Russian operations in Asia were again contemplated at Tilsit; but the war in the Spanish Peninsula, the campaign of 1809, and the rupture between Napoleon and Alexander, which took place shortly afterwards, put an end to all these projects.

During the Crimean war, the Russians again turned their thoughts to an invasion of India, a complete plan of operations being laid before the Czar Nicholas by General Duhamul; and in 1855, General Khrulef proposed a plan based on the lines of the projected operations of 1800 *viâ* Astrabad, Meshed, and Herat, but the project was given up on the conclusion of the war.

In the last war in the east, however (that of 1877-78), the invasion of India was again re-considered, and as early as 1876, Skobelef, who was at that time Governor of the Ferghana, sent General Kauffmann the Governor-General of Turkistan a complete plan of campaign.[†] In 1878, before the signing of the Treaty of Berlin,[‡] active operations were on the point of being undertaken in Afghanistan, when three columns were despatched from Petro-Alexandrovsk on the Oxus, from Samarcand, and from Marguilan. The first column, under General Grotengelm, which was to be supported by troops from the Caspian, ascended the Oxus as far as Tchardjui, and was probably intended to act in the direction of Merv and Herat. The second column, under General Kauffmann, was to advance towards Karki and the Oxus *viâ* Bokhara, and thence on Balkh, Bamian, and Cabul; while finally a column under General Abramof, starting from the Ferghana, crossed the Alai and the Trans-Alai mountains, and attempted to cross the Pamir in the direction of Chitral and Kashmir. The treaty of Berlin put an end to these operations, but General Abramof's artillery had nevertheless succeeded in crossing some extremely high passes which had been hitherto considered impracticable.*

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[*] In a letter dated Strasburg, 21 Vendemaire, XIV year ("*Unpublished letters of Talleyrand to Napoleon,*" P Bertrand, 1889), it is noticeable how Napoleon had his eyes always turned towards Persia and India; Talleyrand's correspondence shows this, especially a despatch dated from Warsaw, 15th March 1807; and we know that General Gardenne was sent as ambassadar to Persia towards the end of this same year.

[†] According to Marvin, in his "*Annexation of Merv,*" this plan comprised two series of operations:—

First, to open up negociations with the Amir of Afghanistan, supporting the negociations by the rapid advance of a Russian force on Cabul.

Secondly, after occupying Cabul, relations were to be opened with all the disaffected portions of India, and an organization and unity of purpose, in which they proved themselves so deficient in 1857, were to be given to the malcontents. It was then proposed to rally large masses of irregular horsemen under the banner of "blood and fire," as in the days of Timour, and to launch these against India.

Skobelef had but a moderate opinion of the military qualities of the native troops in India; the best criterion for estimating these qualities, being, according to him, the fact of India being held by only 70,000 British troops.

[‡] It is well known that in the spring of 1878, between the signing of the treaties of San Stefano and Berlin, war was on the point of breaking out between England and Russia; England had called out her reserves, and had despatched a contingent of native troops to Malta.

The effective force of the three columns was, however, so small (about 20,000 altogether), that it is evident that a diversion on the north-western frontier was only comtemplated, and not the invasion of India.

Since this date, the conditions for an offensive action in Afghanistan, have been completely altered on the Russian side, the construction of the Trans-Caspian railway having shifted their base of operations to the south. In 1878, General Kauffmann would have had to cross the Oxus, the Hindoo-Koosh, and the Suleiman mountains, and Orenburg (which is nearly 1,000 miles as the crow flies from Samarcand) would have been the point where his troops would have had to derail. This point would now be Merv or Samarcand, which are connected by railway with the Caspian, an entirely Russian sea, which in turn is connected with the Black Sea by the railway from Baku to Batum, and also with the network of interior communications of Russia by the Volga. In 1878, Krasnovodsk was separated from Herat by districts which were almost impassable, and where the few oases were inhabited by hostile tribes. Now the desert of Kara Kum is crossed by a railway which connects the Caspian with the Amu Darya, Krasnovodsk with Merv, and Bokhara with Samarcand. Since 1885, the Russian outposts have been at Pul-i-Khatun, 80 miles from Herat, whilst the English outposts at Chaman are 400 miles distant from this place: Russia's chances of success in an offensive movement against Afghanistan have thus sensibly increased.

In proportion as Russia has gradually advanced in Central Asia, so have the opinions of English writers on the question been modified. In a document published by the English War Office in 1869, any serious attempt against the British rule in India by Russia was considered as most improbable. In 1875, however, General Sir H. C. Rawlinson no longer expressed himself so positively. In his opinion, what England had to fear was, not so much an invasion of India, an idea which was only suited to the minds of "panic-mongers" in London and Calcutta—but the creation of a Russian province north of the Hindoo-Koosh, possessing sufficient vitality to strengthen the mother country instead of weakening it, and capable of becoming in time a formidable rival of the Indian Empire.

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* Curzon. According to M. Elyse Reclus, in the *Geographie Universelle: l' Asie Russe*, General Abramof had as early as 1876 succeeded in crossing a battery of artillery over a pass higher than Mount Rose (15,425 feet) on the threshold of the Kara-Kazik in the Alai mountains.

Finally, in a recent work which we have frequently quoted, Mr. Curzon does not credit the Russians, excepting a few theorists amongst them, with any intention of undertaking the conquest of India, for they would meet with too many difficulties of every kind. But he considers as much more serious, the chances of an invasion of Afghanistan, followed by the seizure of points like Herat or Balkh, the possession of which by the Russians would seriously compromise the safety of the frontiers of India.* In his opinion, the real objective of this invasion would be Constantinople and not Calcutta—the Golden Horn and not the Ganges; and he thinks that the solution of the eastern question would be more easily effected on the banks of the Helmand and the Indus, than in the plains of Roumelia or Bulgaria. Was it not General Skobelef who in 1878 wrote: "In the event of a serious demonstration in the direction of India, probably Kandahar way, all idea of a war in the Balkan peninsula would have to be laid aside"? Russia's object then would thus be, *to keep England quiet in Europe by threatening her in Asia.*

A few English writers accordingly now admit that an offensive movement from Turkistan against Afghanistan, and perhaps India, is possible, though perhaps not, at present, probable.

What would be the principal lines of invasion? Colonel Valentine Baker in 1876 mentioned five, namely: Samarcand to Balkh; Bokhara to Balkh; Merv to Herat; Sarakhs to Herat; and finally Meshed to Herat, this eastern route encroaching on a portion of Persian territory in Khorassan. All these five routes converge on two points—Cabul and Herat. To these we may add another, a route which has been exposed by General Abramoff's expedition from 1870 to 1878, and by the anxiety which England has shown for some years past about Kashmir, and especially about Gilgit. This route includes all the roads which lead from the Ferghana into Kashgar, Swat, and Kashmir, across the Pamir or across the highly situated valleys of the Oxus basin. These roads—which cross a very difficult country, a country at a great height above sea level and one very deficient in resources—would probably only be useful for effecting a diversion; this at least, being the opinion of the majority of English writers.† According to Curzon, a column debouching from Ferghana on to the Alai plateau *viâ* the Taldik pass (12,700 ft.) would cross the Pamir by the Kizil-Art Red Col (15,250 ft.)‡, and passing along the Kara-Kul lake (13,940 ft. above sea level), would then proceed in a south-easterly direction on Tashgurghan *viâ* the Ak-su valley. It could thence descend by the Baroghil pass (11,970 ft.) either on Yassin, Gilgit, and Kashmir, or on Chitral, Kafiristan, and Jellalabad.* It is true that operations here would only be possible from June to September; but any opposition on the part of England could only be met with when the Russians debouched in Kanjut and Yassin, in the direction of Gilgit.

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* The same idea is further developed by Mr. Curzon in a letter to *The Times* of October 10th 1890, where he shows the military importance of the Trans-Caspian railway, an opinion opposed to that of General Sir J. Adye.

† Notably, Andrew in his "*Our Scientific Frontier*"; and Curzon in the work which we have already quoted.

‡ 13,960 ft. according to some writers.

Another less difficult route might be adopted, between Bokhara and Chitral, across Badakshan and the Hindoo-Koosh, but this district is subject to the Amir of Afghanistan, and an armed resistance on the part of the Afghans would possibly have to be reckoned on.

A Russian offensive movement in the direction of Balkh or Khulm, might equally easily be undertaken by making Bokhara the base; Bamian, or one of the many neighbouring passes of the Hindoo-Koosh could be easily reached; and owing to the racial affinities between themselves and the Turcomans, and to the neighbourly relations which they maintain, the inhabitants of Afghan Turkistan would probably offer only a feeble resistance. Finally, the Amu Darya might be utilized, at any rate from Tcharjui to Karki, for revictualling the troops.

But the real route for an invasion of India appears to be the Herat-Kandahar line, and this whether the former place be selected as the point of issue after crossing Khorassan *viâ* Meshed, whether it be decided to ascend the Hari-Rud as far as Sarakhs, or whether the advance be made along the Murghab from Merv to Penjdeh. On this point English writers appear to be unanimous. As early as 1863, General Sir H. C. Rawlinson in a well known memorandum wrote:—"If ever a foreign army descends on our Indian frontier, it will be by Herat and Kandahar......and not by the difficult passes between Cabul and Peshawar." Andrew in his "Our scientific frontier," Marvin in "Merv, the Queen of the World," and Sir Frederick Roberts the Commander-in-Chief in India, in a memorandum dated 12th May 1881, are all of the same opinion, which has finally been lately supported by Sir Richard Temple, a high Indian official.†

The possibility of a Russian advance by Herat and Kandahar has led to the construction of the Sind-Pishin Railway by England and to the fortification of Quetta. An invasion of Afghanistan in this direction would offer especial facilities. From the Amu Darya to the Hari-Rud near Zulfikar, the Afghan frontier extends for more than three hundred miles without being marked in any way by any natural obstacles—it is "a line of length without strength," a long, weak, line, which can be broken through anywhere. Less than two hundred and eighty miles from Herat, the Merv oases would constitute a base linked by the Trans-Caspian railway on one side to the Caspian, and on the other to Bokhara, Samarcand, and very shortly Tashkent.

In the event of the Russian attack being directed against Herat, Khorassan would acquire a special importance. From Kizil-Arvat to Dushakh, it covers the right flank of the Trans-Caspian railway; it would also give Russia a double route leading either to Herat, or to

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* This was a portion of M. Bonvalot's itinerary in his exploration of the Pamir.

† "The weak points in our Indian Frontier Defence" *New Review*, September 1889.

Sistan, the latter route permitting Herat, Kandahar, and Quetta to be turned, and India assailed through Baluchistan;* though it is true the great distances and the difficulties of obtaining supplies on the plateaux of Baluchistan would more than counterbalance the facilities offered by this route as compared to the Herat one.

It may, however, be accepted as a fact that Khorassan could easily furnish the supplies required by an army. Once at Meshed, which is about to be connected with the Trans-Caspian railway by a good road, communication with Herat could be maintained without any difficulty by a road a little more than three hundred miles long, and practicable for carriages. According to letters on "Persia and the Persian question" published in *The Times* in 1889 and 1890, the inhabitants would not offer the slightest resistance.

It would thus appear that the principal Russian attack, whether coming from Meshed, Sarakhs, or Dushakh, or from Penjdeh and Merv, would be in the direction of Kandahar *viâ* Herat. According to Curzon, the following means are at present at the disposal of the Russians. The normal garrison of the Trans-Caspian districts is about 14,000 men;† Curzon further admits that from 150,000 to 200,000 men, drawn from the Caucasus, or from the south and centre of Russia, could be easily concentrated on the eastern shores of the Caspian; the Russian Government possesses 70 steamers, and there are in addition 790 merchant steamers and from 1,200 to 1,500 sailing vessels on this sea. The means of transport at their disposal are thus fully sufficient for their purpose. The only difficulty would be the disembarkment of troops on the eastern shore of the Caspian; Uzun Ada is but an indifferent port, not very deep, and often covered with ice; Krasnovodsk would be more suitable as soon as it is connected by a railway with Molla-Kara, and is made the terminus of the Trans-Caspian railway.

Meanwhile, Curzon supposes that the troops which are concentrated west of the Caspian could be transported across it in a week, but the want of water and of supplies of every kind would delay their further advance from Uzun Ada to the Afghan frontier. Moreover, the getting together of 100,000 camels, which the English writer, allowing for a little exaggeration, considers indispensable for an expedition into Afghanistan, would require a considerable time. Under these conditions, it would be possible to concentrate at least 50,000 troops, in at most four weeks, on the Afghan frontier of the Trans-Caspian districts in the zone between Dushakh and Merv.‡

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* Curzon "Russia in Central Asia."

† 11 or 12 battalions of infantry, 2 regiments of cossacks, and 4 batteries.

‡ In a conference which was held at Simla in July 1889, the English Colonel Le Mesurier freely admitted that the transport of 47,000 men from Batum to Uzun Ada could be accomplished in 12 days. The Prussian Major Otto Wachs (*Die Weltstellung England, 1886*) thought that an army of at least 40,000 or 50,000 men could in three weeks be thrown into Central Asia, from the shores of the Black Sea and the Caucasus.

Finally, the *Broad Arrow* of 26th March 1887, admitted that *within a month*, 8,000 Russians could be at Sabzawar, 20,000 at Herat, half of these coming from Europe, and 10,000 at Balkh; that 30,000 men, moreover, could be marching from Merv and Sarakhs on Herat, and that a second army corps, of about 45,000 men, could be concentrated at Merv and Sarakhs.

But these are not the only troops which Russia could utilize. They could also bring into line their normal troops of occupation in Turkistan (30,000 men, 5,000 horses, and 60 guns); though these troops are certainly scattered over a vast extent of country, the greater part of them happen to be concentrated at Tashkent and Samarcand. The district of Omsk could also furnish some troops. It would be accordingly possible, according to Curzon, to concentrate at least 20,000 or 30,000 men on the Oxus, opposite Balkh and Cabul. These numbers could also be sensibly increased by reinforcements from Russia-in-Europe, which could use either the Bostal route from Orenburg to Tashkent, or the Oxus from the Aral to Tchardjui or to Karki. An army could thus be formed on the Oxus of very nearly the same strength as the one which would be already assembled south of Merv, and could act either with the latter, or more probably independently, while still combining its operations with the southern army.

In an unpublished memorandum, which Mr. Curzon quotes, Colonel Sir Charles MacGregor of the Bengal Staff Corps, recognized the fact that Russia could concentrate 95,000 regular troops on the Afghan frontiers in from 80 to 100 days. The author of *Russia in Central Asia* has arrived at the same conclusion; and bearing in mind the progress which is being daily made in Turkistan and the Trans-Caspian districts, it is quite permissible to think that this delay might be sensibly reduced. The construction of the section between Molla Kara and Krasnovodsk, the continuation of the Trans-Caspian railway as far as Tashkent, and improvements in the network of railways in eastern and southern Russia, will still more favourably improve the position of Russia.

Having considered the conditions under which Russia could undertake the offensive in Afghanistan, we may now conveniently examine the dispositions which England could adopt for the defence of this country and her Indian frontier.

She appears to have decided in considering any serious encroachment of Russia on Afghan territory as a *casus belli.* "Any further advance of a great military power towards the frontiers of India would necessitate so excessive an expenditure on the part of the latter, in the shape of fortifications or other defences, that the situation would become absolutely intolerable; any other eventuality would be preferable, however serious the consequences might be."* It may accordingly be taken for granted that, in the event of Russia marching on Herat, the English would probably enter Kandahar and perhaps Cabul. What forces have they at their disposal for the defence, not only of Afghanistan, but also of their north-western frontier? They may be reckoned at about 73,000 British troops, and 145,000 Native,—a total of 218,000 regular troops; to which may be added 10,000 reserve men, 19,000 European or Eurasian volunteers, and 27,000 troops organized from the native feudatory states, say a total of 56,000 irregular troops. The 344,000 irregular troops of the feudatory states, and the 54,000 regular police,* cannot be taken into account, especially as the loyalty of the former is doubtful.

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* Speech of the Marquis of Dufferin and Ava, late Viceroy of India, at a Mansion House banquet on the 29th May 1889. Curzon does not appear to admit this conclusion as being necessarily forced on her; in his opinion, even supposing the Russians at Herat, England should choose her own time before declaring war.

To sum up, the actual available number of troops in India would amount to 220,000 British or Native regular troops, and to 50,000 or 60,000 auxiliaries of doubtful value. But England is far from being able to dispose of the whole of this force against an organized enemy. According to an official report published in 1884,† the troops available to take the field, after deducting the indispensable garrisons, would amount to 18 battalions of British infantry, 40 of Native infantry; five regiments of British, and 16 of Native cavalry; 30 batteries, field and horse, three heavy batteries, and seven mountain batteries; and 21 companies of engineers; forming a total of about 55,272 infantry, 12,674 horses, and 240 guns. The remaining troops would be absorbed in watching the country.

Since 1884, the effective strength of the Anglo-Indian army has been increased by about 5,000 European, and 15,000 Native troops; but the conquest of Upper Burma, and the occupation of other districts have sensibly increased the extent of country which has to be protected. The figures given above may be accordingly considered as fairly correct, and we may conclude that the effective strength of the force which would be available in India for active operations would amount to 60,000 or 70,000 combatants. In 1884, this total was considered the maximum which would be ever required, an opinion which has been probably altered since then. However that may be, given these numbers, it may be asked, how are these troops to be distributed? And what time will be required to concentrate them within reach of the theatre of war?

In an article published in 1889,‡ Sir Charles Dilke is confident that it would be possible to form two army corps, each about 35,000 strong, composed half of British and half of Native troops, with a reserve of 15,000 men.‖ To form this reserve it would be necessary to denude the garrisons in India of six battalions of British infantry, replacing them by a similar number of battalions from England. Sir Charles Dilke considers that the first army corps could be concentrated at Kandahar in six weeks, and the second at Kandahar or Kabul in three months.¶

The effective numbers which Russia and England could bring into line in three months' time—the former between Herat and Balkh, and the latter between Kandahar and Cabul, would thus be nearly equal. But if the reinforcements which the two armies would subsequently receive be taken into account, very different results will be arrived at. In one week, Russia could bring up troops from the western shore of the Caspian to the terminus of the Trans-Caspian Railway; while four weeks would at least be required (of which the voyage would occupy twenty-five days) before reinforcements from England could reach Kandahar. Moreover, this result would be dependent on the Suez Canal remaining intact; even the temporary blocking of the Canal on the outbreak of war would perceptibly alter these figures to England's disadvantage. Mr. Curzon accordingly finds forced on him the conclusion that "England is deplorably behind its rival in point of time."

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* A kind of native *gendarmerie*, officered by Europeans.

† East Indian Army Return.

‡ *Fortnightly Review*, April 1889.

‖ Hitherto, the formation of two army corps had always been approved of. But according to the *Army and Navy Gazette* of the 13th September 1890, another reorganization might have been adopted, by which there would have been three army corps in peace time, with Calcutta, Bombay and Madras as their head-quarters, a fourth or reserve corps being formed for war.

¶ According to the *Broad Arrow* of 26th March 1887, from which we have already quoted, England could have *within a month*, 30,000 men at Girishk on the Helmand, 10,000 at Kandahar, 3,000 at Kelat-i-Ghilzai, 3,000 at Ghazni, 10,000 at Cabul, and 20,000 troops marching on Bamian.

For a strictly accurate comparison, two subordinate factors should be taken into account, *i. e.* the forces of Bokhara and Afghanistan—factors, whose value however it is difficult to estimate. According to all the information which has been published regarding the Afghan troops,* they may be reckoned as about 60,000 strong (45,000 infantry, 16,000 horse, and 222 guns), almost regularly organized, and armed with modern weapons, relatively speaking. Their individual bravery would make them formidable *guerilla* troops, but it is not so easy to estimate what part they would play alongside of regular troops. Their defeat in 1885 by the Russians and their auxiliary Turcoman troops, does not denote any great military qualities, and their northern neighbours have not a very high opinion of them, while on the other hand, it would not appear that the English could implicitly reckon on the active co-operation of their former adversaries of 1840 and 1878-81. They would probably more easily find the Afghan tribes a good recruiting field for their native regiments. The Afridis, Jamshidis, Shinwaris, Duranis, Ghilzais, and Hazaras would make excellent soldiers if officered by Europeans. Mr. Curzon even goes so far as to put the number of men which these tribes could furnish in this manner at 200,000.

As for the troops which Bokhara could furnish to Russia, these, according to the same writer would be an absolutely insignificant quantity. They only number about 12,000 men, badly armed, and without any regular organization or discipline.†

Having rapidly glanced at the means which would be at the disposal of England for the defence of India, we will now consider what would be her principal line of resistance. At first sight the long ditch of the Indus appears to constitute an excellent frontier, one which can be easily defended, and which is only passable at a very few points. Attock and Sukkur, the two permanent points of passage, are protected by fortifications, and are further covered by Peshawar and Quetta. Between these two points, a railway runs along the river nearly the whole way, connecting with the Indian railway system at several points. In every way then, the Indus appears to possess better defensive conditions than the irregular frontier line between Afghanistañ and India which at present exists. This line indeed, which does not even follow the crest line of the Suleiman mountains, is passable at numerous points; not counting the classic passes of the Khyber, the Kurrum, the Gomul, and the Bolan, there are some fifty others, some of which could be used. It would accordingly appear that the defence of India ought to be based on the Indus, a plan which was upheld by Sir W. F. Andrew in 1878.*

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* Curzon in his book already quoted; the *Allgemeine Militär Zeitung*, *die Afghanische Armee*, 22 April 1885; *Revue Militaire de l' Etranger* for the 2nd half year of 1878, No. 424.

† Regarding these troops see the *Revue Militaire de l' Etranger* for the 1st half-year, 1882 p. 293. *The Times* of 1st, 4th, and 10th September 1890, announced that Russian officers had been appointed to organize and drill the forces in Bokhara.

But it should be borne in mind that a river, no matter how broad it may be, is always passable. In 1813 Napoleon wrote to Prince Eugene:—"It must be accepted as a principle that a river can never be considered an obstacle which is capable of retarding an enemy for more than a few days; and its passage can only be defended by placing troops in force in *têtes-du-pont* on the other bank, ready to assume the offensive as soon as the enemy commences to cross. If the river is to be defended passively, the only course to be taken is, to so dispose one's troops as to be able to fall in a combined mass on the enemy before the latter has completed the crossing . . . . There is nothing more dangerous than to attempt to seriously defend a river by lining the opposite bank; for once the enemy has effected a crossing by surprise, which invariably happens,—he finds the opposing force greatly extended on the defensive, and prevents it from rallying."

But there is perhaps a much more serious objection against a defence along the line of the Indus, *i. e.* that of giving the assailant a very far reaching moral advantage. As early as 1875, Sir H. C. Rawlinson attempted to show that, far from awaiting Russia on this river, Herat should be occupied the very day that the Russians entered Merv: once mistress of Herat, Russia's fingers would be at India's throat." And the moral effect, which is always so important, would be much greater in this case. An English military review has drawn attention to it lately.† The English up till now have only ruled their Indian subjects by means of their prestige, and by moral force; this power will be seriously weakened the moment an European power appears on the frontiers of India. On this point all competent writers on the question appear to be almost unanimously agreed.

India must then be defended in Afghanistan;‡ and it is this which has led to the occupation of Quetta by England, to the continuation of the Indian railway lines in the direction of Kandahar, and to preparations for constructing a railway from Peshawur to Cabul.

Moreover England could not restrict herself to only defending Kandahar and Peshawar. These two points are not, in fact, connected by a direct road, besides which there are several passes between the

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* *Our Scientific Frontier.*

† *United Service Magazine* for September 1890; "Army Reform in native states in India."

‡ Captain C. M. Maguire, Gold Medallist (1890) of the United Service Institution of India, recommends a vigorous offensive as the best plan of defending India.

Khyber and the Bolan, notably the Gomul pass, which are easily practicable. It has been frequently proposed to fortify the Gomul pass, but these fortifications could be turned by the Tochi pass, which debouches in front of Bannu, and probably by others also.* To close all these it would be necessary to construct a long line of forts, a kind of wall of China, the defence of which would absorb the greater part of the Anglo-Indian troops, without making an absolute certainty of preventing all access to the Indus valley.

For these reasons, the advisability of occupying the Cabul, Ghazni, Kandahar line, on the first movement of Russia against Afghanistan, seems agreed upon. It is considerably shorter than the Peshawar—Kan dahar, or Peshawar—Sukkur lines ; † the three principal points which mark the line are the centres of the communication between India, Afghanistan, and Turkistan, as also between northern and southern Afghanistan ; and an English army occupying these points could easily form front to the north-east in the direction of Balkh, or to the north-west towards Herat, according to the direction taken by the main invading army. This plan of operations, which unites the advantages of the defensive and the offensive, accordingly appears preferable to a purely passive defence of the Peshawar—Kandahar line, or to an offensive in the directions of Herat and Balkh. ‡ If the railway lines from Attock to Peshawar, and from Sukkur to Chaman, were to be continued to Cabul and Kandahar respectively, England's position in Afghanistan would be considerably strengthened.

The occupation of Cabul, Ghazni, and Kandahar, on the outbreak of hostilities between England and Russia, accordingly appears indispensable ; and in all probability, the Anglo-Indian troops would have no difficulty in accomplishing this. It is true that Russia might reply by seizing Herat and Balkh ; and Curzon even thinks that she would thus obtain superior moral, as well as material, advantages. Cabul, Ghazni, Kandahar, have all been occupied over and over again by the English, only to be almost immediately evacuated ; and their entry into these places would not exercise the same moral effect on the populations of India, Afghanistan, and Cental Asia, as would be produced by the seizure of Herat, or even of Balkh, by the Russians, while the latter would at the same time be acquiring fertile territories, which would allow of a base for further operations being organized under very favourable conditions.

The above, in their entirety, are the general considerations which will probably affect the situation in Central Asia, considerations which England will, doubtless, grasp, if she has to protect Afghanistan, and the north-western frontiers of India against Russian aggression. We may conclude (as an English authority has done), || that the Russians

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* "The weak points in our Indian Frontier Defence," by Sir Richard Temple, (*New Review*, September 1889).

† It is 280 miles in a straight line from Cabul to Kandahar, and 450 miles from Peshawar to Sukkur,

‡ "*Remarks on our true policy in India*," by a General officer. Colburn's Magazine for April 1889.

|| Curzon, in a letter to the *Times* of 8th October 1890.

would have no difficulty in occupying Meshed, Herat, and perhaps Balkh. With regard to their further operations against the Indian frontier, the principle lines would probably be the Balkh, Cabul, Peshawar line, or the Herat, Kandahar one, the special facilities presented by the latter appearing to indicate it, as *the* route for the invasion of India.

Taking all the above points into consideration, it follows that it will be to England's interest to carry forward her line of defence beyond the Indus, up to the Cabul-Ghazni-Kandahar line.

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United Service Institution of India.

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495 (*o*)	Historical Record of the 1st P. I.	Ditto.	1	1886
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